CHEMISTRY

FOR

Senior Secondary School

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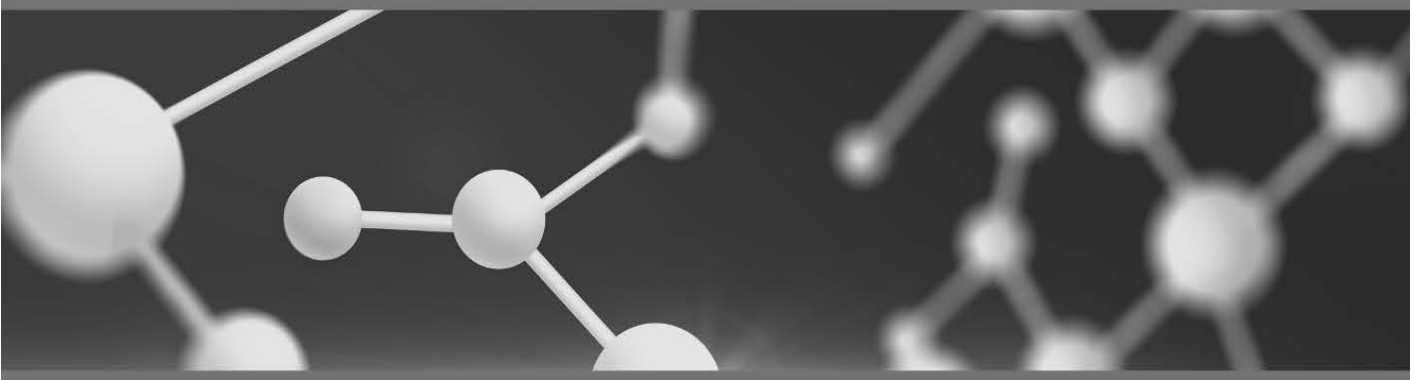
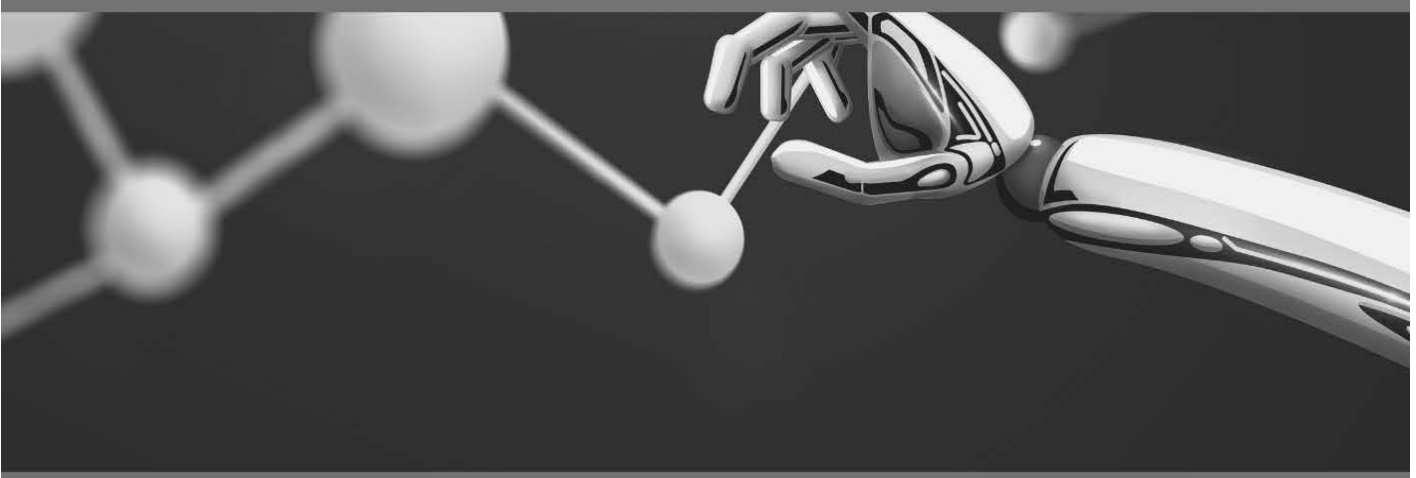


Practice Questions and Answers



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Chemistry Exam Questions and Answers Pack

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QUESTIONS

TOPIC: ACIDS. BASES. SALTS

DIRECTION: Choose the correct answer from the lettered options.

1. Which of the following oxides is basic?

A. NO_2.

B. Al_2O_3.

C. SO_2.

D. CaO.

2. Which is the correct arrangement of the following compounds iaccording to increasing acidic strength?

A. H_2SO_4 > HCl > HBr > HI.

B. H2SO4 < HCl < HBr < HI.

C. HCl >H_2SO_4 > HBr > HI.

D. HI < HBr > HCl <H_2SO_4

3. Which of the following compounds is a base?

A. CO_2.

B. CaO.

C. H_3PO_3.

D. CH_3COOCH.

4. The following except _____ are the different types of salts.

A. normal salt, acid salt, basic salt, complex salt and double salt

B. normal salt, double salt and acid salt

C. complex salt, basic salt, acid salt and hydrolyzed salt

D. double salt, basic salt and complex salt

5. Which of the following are characteristic properties of acids?

(I) They form oxonium ions in water.

(II) They liberate carbon (IV) oxide from trioxocarbonate (IV) salts.

(III) They turn blue litmus red.

(IV)They have a soapy feel.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

6. An alkali is _____

A. a basic hydroxide.

B. an acid hydroxide.

C. an hydrated basic hydroxide.

D. an aqueous solute.

7. An acid is a substance, which produces water in the presence of _____

A. salts.

B. oxygen.

C. effervescence.

D. hydroxonium ions.

8. A chemical used to determine whether a substance is an acid or a base is called _____.

A. an indicator

B. water

C. a salt

D. an alkaline

9. The pH of a solution is _____

A. log $[H^+]$.

B. log $[-H^-]$.

C. -log $[H^+]$.

D. -log [H].

10. Which of the following compounds will form a solution when exposed to air?

A. $CaCl_2$.

B. $CuSO_4$.

C. $Na_2CO_3.10H_2O$.

D. $NaNO_3$.

11. Which of these salts is not an acid salt?

A. $NaHCO_3$.

B. HCOONa.

C. Na_2HPO_4.

D.

12. The anhydride of tetraoxosulphate (VI) acid is _____

A. sulphur (IV) oxide.

B. sulphur (VI) oxide.

C. hydrogen sulphide.

D. trioxosulphurate (IV) acid.

8.52g of magnesium tetraoxosulphate [vi]- heptahydrate [MgSO4.7H2O] were heated in a crucible to a constant mass, first at a temperature of 130oC. The residue that was obtained at 130oC weighs 5.31g.

13. Calculate the water lost during heating.

[Mg = 24, H = 1, O = 16, S = 32]

A. 5.

B. 3.

C. 4.

D. 2.

14. All common gases are dried using P_2O_5 except _____

A. NO_2.

B. NH_3.

C. SO_2.

D. $H2_S$.

15. The sum of the pH and pOH concentration of a solution is _____

A. 7.

B. 0.

C. 12.

D. 14.

16. The phenomenon whereby substances absorb large amount of water on exposure to the atmosphere is _____

A. deliquescence.

B. hygroscopy.

C. efflorecence.

D. drying agent.

17. The term used for describing a substance that is capable of reacting either as an acid or as a base is _____

A. amphoterism.

B. isomerism.

C. polyprotic.

D. none of the above.

18. Basicity of an acid is _____

A. the number of replaceable oxygen ions, $O2^{-}$ in one molecule of the acid.

B. the number of removable hydrogen ions, H^{+},in one molecule of the acid.

C. the number of replaceable hydrogen ions, H^{+}, in one atom of the acid.

D. the number of replaceable hydrogen ions, H^{+}, in o+=ne molecule of the acid.

19. Which of the following option is not an acid-base indicator?

A. Litmus paper.

B. Phenolphthalein

C. Methane orange.

D. Methyl orange.

20. A solution whose pH cannot be easily altered due to accidental addition of acid or base is called _____

A. plasma.

B. annotated solution.

C. buffer solution.

D. deionized water.

21. Acids can be prepared by the following methods listed except _____

A. dissolving an acid anhydride in water.

B. combination of constituent elements.

C. double decomposition.

D. using a volatile acid from its salts.

22. Which of the following options are general methods of preparing salts?

(I) Neutralization

(II) Precipitation

(III) Double decomposition

(IV) Action of an acid on a metal

A. I & II

B. III & IV

C. I, II & III

D. I, II, III & IV

23. The following substances are all normal salts with the exception of _____

A. $Al(NO_3)_3$.

B. $FeSO_4$.

C. $Mg(OH)NO_3$.

D. NaCl.

24. A solution of pH 7 is _____

A. acidic.

B. neutral.

C. concentrated.

D. dilute.

25. The following pairs of solutions are mixed. Which mixtures produce a precipitate?

A. Calcium chloride and Potassium trioxocarbonate [IV].

B. Sodium hydroxide and Hydrochloric acid.

C. Potassium hydroxide and Trioxonitrate [V] acid.

D. Silver trioxonitrate [V] and Hydrochloric acid.

26. When a metallic oxide reacts with both acids and bases, the oxide is said to be _____

A. acidic.

B. amphoteric.

C. basic.

D. complex.

27. A salt derived from a strong base and a weak acid will undergo hydrolysis and give a solution which will be _____

A. acidic.

B. basic.

C. neutral.

D. viscous.

28. Acid anhydride is the same as _____

A. dry acid.

B. acid that increase its volume when exposed to air.

C. acid made by drying the reactants first.

D. acid made from oxides of non-metals.

29. A 500 mL solution of pH 1 is mixed with the same volume of water. Which of the following best describes the resulting mixture?

A. acidic

B. alkaline

C. basic

D. neutral

30. The theory which states that an acid is defined as a substance that produces hydrogen ion in an aqueous medium and that a base is a substance that produces hydroxyl ion in an aqueous medium is _____

A. Arrhenius law.

B. Arrhenius theory.

C. Bronsted-Lowry theory.

D. Bronsted-Lowry law.

31. Consider the neutralization reaction represented by the following equation;

$Na_2CO_3 + 2HNO_3$

$\rightarrow 2NaNO_3$

$+ H_2O + CO_2$

the stoichiometric ratio of acid to base is _____

A. 2:2.

B. 2:1.

C. 1:2.

D. 1:1.

32. A substance formed when the hydrogen of an acid is partly or completely replaced by a metal or by the ammonium ion is _____

A. salt.

B. alkali.

C. base.

D. acid.

33. Alums are classified as _____

A. simple salts.

B. acid salts.

C. anhydrous salts.

D. double salts.

34. _____ of an acid is the number of replaceable hydrogen ions in one molecule of an acid.

A. Acidity.

B. Alkalinity.

C. Anhydride.

D. Basicity.

35. Which of the following is a general method of preparing acids?

A. Direct combination of constituent elements.

B. Double decomposition involving a salt solution.

C. Reaction between an anhydride and water.

D. Reaction between a base and an amphoteric oxide.

36. Find the hydroxide ion concentration in 0.03M tetraoxophosphate [v] H_3PO_4 acid solution.

A. 1.11 x 10-13mol/$dm^{3.}$

B. 1.11 x 10-12mol/$dm^{3.}$

C. 1.11 x 10-2mol/$dm^{3.}$

D. 1.11 x 10-14mol/$dm^{3.}$

37. The Br0nsted-Lowry theory states that an acid as _____

A. a chemical species that is able to lose or donate a proton.

B. a chemical species that is able to gain or accept a proton

C. a molecule or ion that is capable of accepting an electron

D. a conjugate base.

38. A strong dilute H_2SO_4 ionizes _____

A. slowly but contains more water than acid.

B. fast but contains more water than acid.

C. fast but contains more acid than water.

D. slowly but contains more acid than water.

39. Which of the following acids can function both as a drying agent and as a dehydrating agent?

(I) Fuming HNO_3.

(II) Glycol CH_3COOH.

(III) Concentrated HCl.

(IV) Concentrated H_2SO_4.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

40. Sodium hydroxide is added drop by drop to some hydrochloric acid in a beaker. Which of the following occurs in the beaker?

A. The pH of the hydrochloric acid decreases.

B. The concentration of hydrogen ions increases.

C. The concentration of hydroxide ions increases.

D. The solution turns pink.

41. Which of the following statements is correct?

A. OH^- is the conjugate base of H_3O^+.

B. $O2^-$ is the conjugate base of OH^-.

C. H_3O^+ is the conjugate base of H_2O .

D. HO_2 is the conjugate base of H_2O_2 .

42. $NaCl(s) + H_2SO_4(l) \rightarrow HCl(g) + NaHSO_4(s)$.

In the reaction given above, H2SO4 behaves as _____

A. a strong acid.

B. an oxidizing agent.

C. a good solvent.

D. a dehydrating agent.

43. What is common to both hydrochloric acid and trioxonitrate [V] acid?

A. Both are used for fountain experiment.

B. Both are monobasic.

C. Both are used to prepare hydrogen from zinc granules.

D. Both attack rubber.

44. An oxonium ion is _____

A. H_3O.

B. H_3O^+.

C. H_3O^-.

D. $3[H^+ OH^-]$.

45. Soluble salts can be prepared by _____.

[i] Action of dilute acid on a metal

[ii] Action of a dilute acid on an insoluble base

[iii] Action of a dilute acid on a trioxocarbonate [iv]

[iv] neutralization of an alkali by an acid

A. [i], [ii] and [iii].

B. [ii] and [iv].

C. [i], [ii], [iii] and [iv].

D. [ii], [iii] and [iv].

46. Which pH value indicates a basic solution?

A. -1.

B. 3.

C. 9.

D. 7.

47. How would you prove that sodium hydroxide is a base?

A. Direct touch.

B. Adding water.

C. Reaction with ammonium salts.

D. Reaction with carbon [iv] oxide.

48. A substance that absorb a large amount of water on exposure to the atmosphere and forms a solution is _____

A. hygroscopic.

B. efflorescent.

C. deliquescent.

D. drying agent.

49. Which of the following is not a natural sources of organic acid?

[i] Lactic acid → Milk.

[ii] Ascorbic acid → Oranges.

[iii] Amino acid → Vinegar.

[iv] Citric acid → Lime/Lemon.

A. [i] only.

B. [i] and [iv] only.

C. [iii] only.

D. [iv] only.

50. All of the following acids are monobasic except _____

A. hydrochloric acid.

B. tetraoxosulphate [VI] acid.

C. hydrochloric acid.

D. trioxonitrate [V] acid.

51. A salt which loses mass when exposed to air is _____.

A. hydroscopic

B. deliquescent

C. efflorescent

D. fluorescent

52. Which of the following are physical properties of an acid?

[i] It will have a sour taste.

[ii] An acid ionizes in solution to produce H+ ions.

[iii] It is corrosive to the skin.

[iv] It changes the colour of wet litmus paper from red to blue.

A. [i] and [iv].

B. [i], [ii] and [iv].

C. [i], [ii], [iii] and [iv].

D. [i], [ii] and [iii].

53. The concentration of H+ is 6.20 x 10-5. What is the pOH of each solution?

A. 4.21.

B. 5.00.

C. 9.79.

D. 7.99.

54. Which of the following correctly defines an acid according to the Bronsted-Lowrey theory?

A. It accepts H^+ ions in water.

B. It forms H^+ ions in water.

C. It is a H^+ acceptor.

D. It is a H^+ donor.

55. The complex salt formed when aluminium dissolves in sodium hydroxide solution is _____

A. $Na_3\ Al(OH)_4$.

B. $Na_2\ Al(OH)_3$.

C. $Na\ Al(OH)_3$.

D. $Na\ Al(OH)_4$.

56. The following options are examples of weak acid except _____

A. H_2CO_3.

B. HCl.

C. CH_3COOH.

D. H_3PO_4.

57. _____ is not a type of salt.

A. Acids salt

B. Complex salt

C. Organic salt

D. Basic salt

58. The pH of a 0.001M acid is _____

A. 2.

B. 3.

C. 4.

D. 1.

59. A weak acid is one which _____.

A. is not corrosive

B. is slightly ionized in water

C. does not produce salts with alkalis

D. does not conduct an electric current in aqueous solution

60. A combination of hydrogen ions, H^+ and hydroxide ions, OH^-, to form water molecules and a salt is called _____

A. reaction.

B. neutralization.

C. Arrhenius theory.

D. Bronsted-Lowry theory.

61. $H^{+(}aq) + OH^-(aq) \rightarrow H2O(l)$. The equation represents _____

A. hydrolysis.

B. hydration.

C. neutralization.

D. electron affinity.

62. Which of the following are physical properties of alkalis?

[i] Alkalis have a bitter taste.

[ii] Alkalis are soapy to the touch.

[iii] Alkalis turn red litmus blue.

[iv] Concentrated forms of the two caustic alkalis, sodium hydroxide and potassium hydroxide, are corrosive.

A. [i] and [ii].

B. [i], [ii], [iii].

C. [i], [ii], [iii], [iv].

D. [i], [ii], [iv].

63. Which of these is not recovered through dry heating [evaporation]?

A. NaCl.

B. NH_4NO_3.

C. $CuHSO_4$.

D. $NaHCO_3$.

64. A salt which loses mass when exposed to air is _____

A. deliquescent.

B. effervescent.

C. efflorescent.

D. flourescent.

65. A substance which produces hydrogen ions [or protons] as the only positive ion when dissolved in water is called _____

A. a base.

B. a salt.

C. an acid.

D. an alkali.

66. Which of the following substances is not a salt?

A. Sodium hydrogentrioxosulphate [IV].

B. Lead [ii] trioxonitrate [V].

C. Basic Zinc Chloride.

D. Aluminium oxide.

67. Which of the following salts is most conveniently prepared by neutralisation method?

A. $CuSO_4$.

B. $MgCl_2$.

C. $Na2SO_4$.

D. $PbBr_2$.

68. Which of the following option is an amphoteric compound?

A. $Ca[OH]_2$.

B. $Fe[OH]_2$.

C. $Al[OH]_2$.

D. KOH.

69. Which of the following is the strongest Bronsted base?

A. CH4

B. NH3

C. H2O

D. HF

TOPIC: AIR POLLUTION

DIRECTION: Choose the correct answer from the lettered options.

1. Which of the following statements correctly gives evidence that air is a mixture?

(i) The constituents of air can be separated by physical methods.

(ii) The constituents of air still retain their individual properties.

(iii) If the different constituents of air are mixed together, there will be no evidence of any chemical combination such as heat production or volume change

(iv) The composition of air cannot be represented by chemical formula as in the case of a compound.

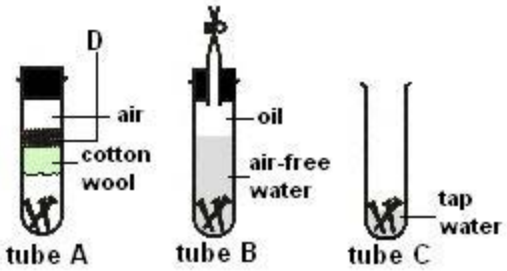
A. (i), (iii) and (iv).

B. (i), (ii), (iii) and (iv).

C. (ii), (iii) and (iv).

D. (i), (ii) and (iii).

2. From the diagram drawn, the part labelled D is _____



A. fused calcium oxide.

B. anhydrous calcium chloride.

C. anhydrous calcium tetraoxosulphate (VI).

D. fused calcium hydroxide.

3. All these are the causes of luminousity in flames except _____

A. solid particles.

B. solid particles and increased temperature.

C. solid particles and increased pressure.

D. size of materials burnt.

4. The phenomenon whereby the flame enters the tube to consume any oncoming fuel as a result of the air-hole at the base of the burner tube is widely opened or the fuel supply is slowly turned down is known as _____

A. striking-back.

B. feedback.

C. suction.

D. none of the above.

5. Which of the pollutants causes acid rain?

A. oxides of carbon and oxides of sulphur.

B. oxides of sulphur.

C. oxides of nitrogen and oxides of carbon.

D. oxides of nitrogen and oxides of sulphur.

6. What causes luminosity in a flame?

A. Presence of excess oxygen.

B. Presence of limited oxygen.

C. Presence of solid particles.

D. None of the above.

7. What chemical process is represented by the following equation?

$4Fe_{(s)} + 3O_{2(g)} + 2xH_2O_{(l)} \rightarrow 2Fe_2O_3.\ xH_2O_{(s)}$

A. Combustion.

B. Oxidation.

C. Hydration.

D. Rusting.

8. Which of these is not necessary for metallic corrosion?

A. Water.

B. Oxygen.

C. Heat.

D. Sulphur [IV] oxide.

9. Which oxides of carbon allows an increase in infra red ray in the atmosphere?

A. CO.

B. $CO3^{-2.}$

C. CO2.

D. all of the above.

10. Which element present in the atmosphere slows down combustion and corrosion?

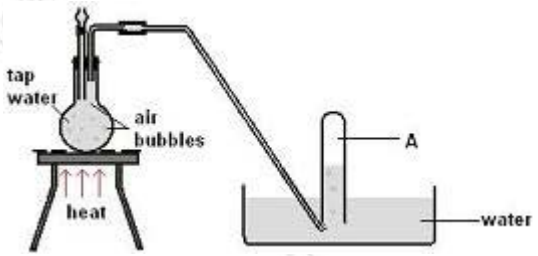
A. Carbon (IV) oxide.

B. Nitrogen

C. Xenon.

D. Oxygen

11. The part labelled A in the diagram drawn is _____



A. CO.

B. CO_2.

C. air.

D. H_2.

12. Which of the following is a zone identified by a candle flame?

(i) The zone of unburnt gas around the wick.

(ii) The bright yellow luminous zone.

(iii) The barely visible, non-luminous zone.

(iv) The violet zone at the base of the flame a region of incomplete combustion.

A. (i), (ii) and (iii).

B. (ii), (iii) and (iv).

C. (i), (iii) and (iv).

D. (i) and (iv).

13. _____ burns with a very faint non-luminous flame.

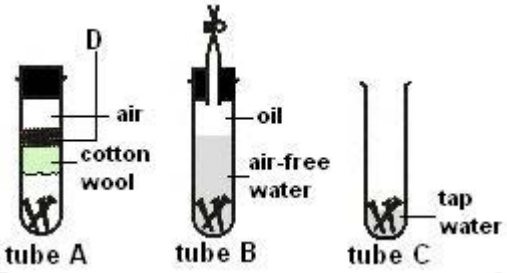
A. Oxygen

B. Hydrogen

C. Chlorine

D. Candle

14. From the diagram drawn, tube B contains _____



A. water alone.

B. air alone.

C. air and water.

D. oil alone.

15. Carbon (IV) oxide is released into the atmosphere via _____

A. photosynthesis.

B. carbonation.

C. absorption.

D. respiration.

16. The main air pollutants include the following option except _____

A. oxides of carbon.

B. oxides of sulphur and nitrogen.

C. particulate matter.

D. oxides of hydrogen.

17. Which of the following options best produces a luminous Bunsen flame?

A. The air-hole at the base of the burner tube should be opened.

B. The air-hole at the base of the burner tube should be filled with gas.

C. The air-hole at the base of the burner tube should be closed.

D. The gas pressure at the base of the burner tube is increased.

18 Which of the following methods are ways of preventing the rusting of iron?

[i] The use of tar and enamel

[ii] The use of grease and oil.

[iii] Galvanizing the iron.

[iv] Electroplating the iron.

A. [i], [ii] and [iv].

B. [i], [ii], and [iii].

C. [i], [ii], [iii] and [iv].

D. [ii], [iii] and [iv].

19. A gradual warming of planet earth is called _____

A. greenhouse effect.

B. pollution.

C. ozone depletion.

D. none of the above.

20. Corrosion of metals is accelerated by the presence of _____

A. carbon (II) oxide and sulphur (VI) oxide.

B. carbon (IV) oxide and sulphur (IV) oxide.

C. nitrogen (IV) oxide and carbon (IV) oxide.

D. carbon (II) oxide and sulphur (IV) oxide.

21. What increases the luminosity of a flame?

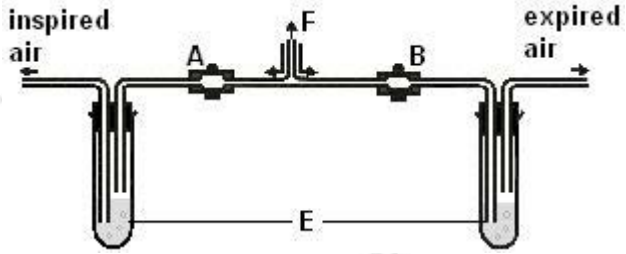
A. Increase in supply of oxygen.

B. Increase in temperature of solid particles.

C. Increase in temperature or pressure of oxygen.

D. Increase in temperature or pressure of burning gases.

22. The diagram drawn is an illustration to study _____



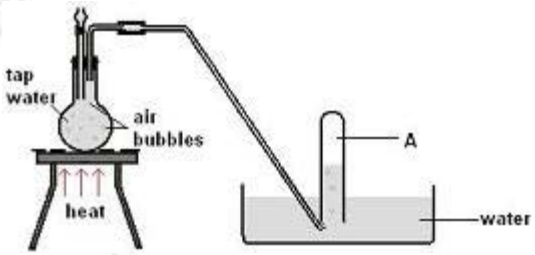
A. CO_2 is more in inspiration than expiration.

B. CO is more in inspiration than expiration.

C. CO is more in expiration than inspiration.

D. CO_2 is more in expiration than inspiration.

23. The diagram drawn is an illustration of an experiment used to _____



A. study the presence of CO_2.

B. find out if tap water dissolves in air.

C. study the absence of air in water.

D. find if air contains CO_2.

24. Which pollutant causes brain damage, dizziness, headaches, fatigue and lethargy?

A. CO.

B. $PbBr_2$.

C. Pb.

D. CO_2.

25. These gases burn with blue flame except _____

A. H_2.

B. CH_4.

C. C_2H_2.

D. CO.

26. The following statements explains burning except _____

A. burning is a oxidation process.

B. burning must involve iron.

C. burning gives out large amount of heat.

D. burning is an active rapid process.

27. When pollutants are trapped in air above the earth's surface it forms _____

A. smog.

B. soot.

C. dust.

D. smoke.

28. Which of the pollutants causes eye, nose, throat irritation and respiratory tissues?

A. oxides of nitrogen.

B. oxides of sulphur.

C. oxides of sulphur and oxides of nitrogen.

D. oxides of carbon.

29. Which of the following options is not an element?

A. americium.

B. zirconium.

C. water.

30. The component of air that is removed when air is bubbled into alkaline pyrogallol solution is _____

A. carbon (IV) oxide.

B. helium.

C. nitrogen.

D. oxygen.

E. water vapour.

31. Which of the noble gases is used in the electric lamps to prevent oxidation of the lamp filaments?

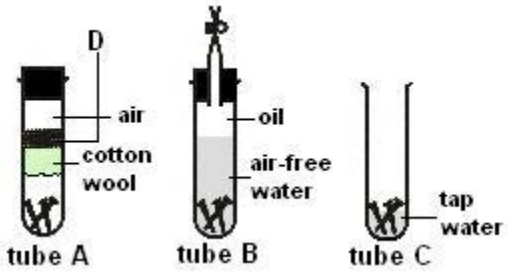
A. Krypton.

B. Radon.

C. Neon

D. Argon.

32. The diagram drawn is an illustration of the experiment to _____



A. show the rusting of iron.

B. study the mechanism of rusting of iron.

C. show that air and moisture are necessary for the rusting of iron.

D. study the process of rusting of iron.

33. Which of the following is correct about the zones identified by a non-luminous flame?

(i) the unburnt gas zone.

(ii) the luminous zone.

(iii) the outermost non-luminous zone.

A. (iii) only.

B. (i) and (iii).

C. (ii) only.

D. (i), (ii) and (iii).

34. Which noble gas is used in the photographer's flash tube?

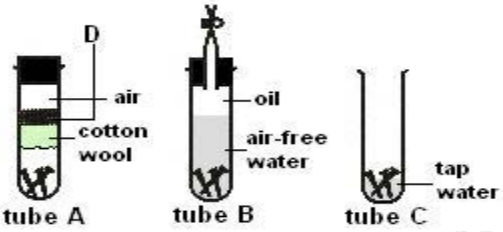
A. Neon and helium.

B. Argon and xenon.

C. Krypton and xenon.

D. Radon and neon.

35. From the diagram drawn, tube C contains _____



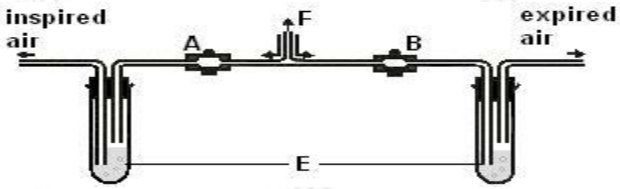
A. water alone.

B. oil alone.

C. air and water.

D. air alone.

36. The diagram drawn, the part labelled E is _____



A. quick lime.

B. slaked lime.

C. carbonated lime.

D. lime water.

37. A region where gases combine chemically with the production of heat and light is known as _____

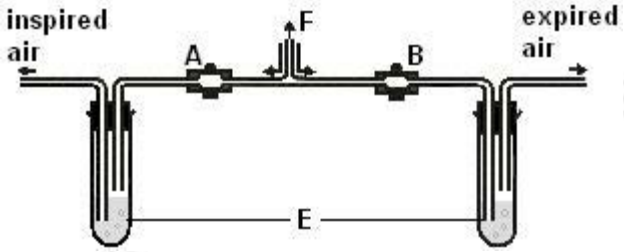
A. fire.

B. explosion.

C. glow.

D. flame.

38. The diagram drawn, the part labelled F is _____



A. to mouth.

B. to reagent.

C. to water.

D. to air.

39 Combustion is a chemical reaction which is always accompanied by _____

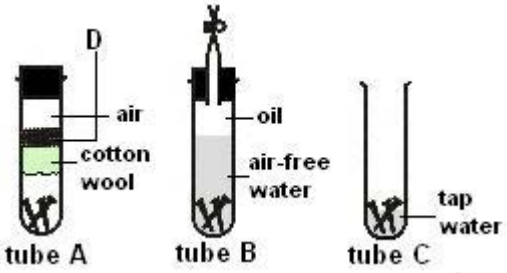
A. heat.

B. heat and light.

C. heat and energy.

D. heat and power.

40. From the diagram drawn, tube A contains _____



A. water alone.

B. air and water.

C. oil alone.

D. air alone.

41. The following are major gaseous pollutants except _____

A. oxides of carbon e.g. CO.

B. oxides of sulphur e.g. SO_2.

C. chlorofluorocarbon.

D. carbon (IV) oxide.

42. The most abundant noble gas in nature is _____

A. Neon.

B. Radon.

C. Helium.

D. Argon.

43. To produce a non-luminous bunsen flame, _____

A. the air-hole at the base of the burner tube should be opened.

B. the air-hole at the base of the burner tube should be filled with gas.

C. the air-hole at the base of the burner tube should be closed.

D. the gas pressure at the base of the burner tube is reduced.

TOPIC: ATOMIC STRUCTURE. CHEMICAL COMBINATION

DIRECTION: Choose the correct answer from the lettered options.

1. The arrangement of ions in a regular pattern in a solid crystal is called _____

A. configuration.

B. atomic structure.

C. lattice.

D. buffer.

2. Which of the following noble gases has electronic structure similar to that of N in NH_3?

[147N]

A. $_{2}He$.

B. $_{10}Ne$.

C. $_{18}Ar$.

D. $_{36}kr$

3. Water has a rather high boiling point despite its low molecular mass because of the presence of _____ bonding.

A. covalent

B. dative

C. hydrogen

D. ionic

4. _____ are different forms of the same element in the same physical state.

A. Isotopes.

B. Allotropy.

C. Isotopy.

D. Allotropes.

5. What is the total volume of the mixture of gases produced when 100 cm^3 of X is heated?

A. 200 cm^3.

B. 400 cm^3.

C. 100 cm^3.

D. 600 cm^3.

6. The principle which states that two electrons in the same atom cannot have the same values for all four quantum numbers is known as _____

A. Hund's rule.

B. Pauli Exclusion Principle.

C. Uncertainty Principle.

D. none of the above.

7. Which of the following electronic configuration is correct for sulphur with atomic number of 16?

A. $1s^2 2s^2 2p^4$.

B. $1s^2 2s^2 2p^6 3s^2 3p^4$.

C. $1s^2 2s^2 2p^6 3s^2 3p^6$.

D. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$.

8. An element belongs to a period in the periodic table because of _____

A. the number of electrons in its outer-most shell.

B. the number of shell.

C. the electronic configuration in the azimuthal quantum number.

D. the size of the atom.

9. A solid substance with high melting and boiling points is likely to be _____

A. a covalent compound.

B. a dative covalent compound.

C. an electrovalent compound.

D. a non-metal.

10. When energy needed to break up bonds is greater than energy liberated on hydration of ions in an ionic compound the compound is said to be _____

A. soluble.

B. hydrated.

C. insoluble.

D. dissociated.

11. An ionic bond is often formed when _____.

[i] the combining atoms need to lose electrons in order to attain a noble gas configuration

[ii] the combining atoms both need to gain electrons in order to attain a noble gas configuration

[iii] two non-metallic elements react together

[iv] a metallic element combines with a non-metallic element.

A. [i] only.

B. [i], [ii] and [iii] only.

C. [i] and [ii] only.

D. [iv] only.

12. A solid which melts at 1020oC and is an electrolyte when molten. This solid has _____

A. a molecule structure.

B. a giant atomic structure.

C. a metallic structure.

D. a giant ionic structure.

13. The bond between two iodine molecules is _____

A. co-ordinate bond.

B. electrovalent bond.

C. ionic bond.

D. covalent bond.

E. Van der waal's forces.

14. Which of the following compounds has the strongest hydrogen bond

[i] H.F

[ii] HCl

[iii] H_2O.

[iv] HBr.

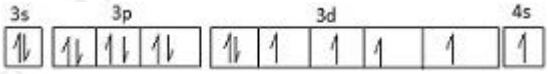
A. [i] only.

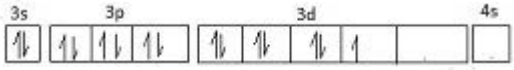
B. [i] and [ii] only.

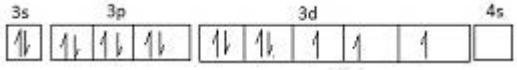
C. [i], [ii] and [iv] only.

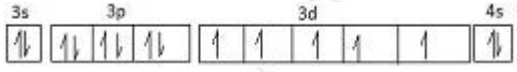
D. [iii] only.

15. Which of the following is the correct order of filling electrons in the third and fourth shells of the element 25X?

A. 

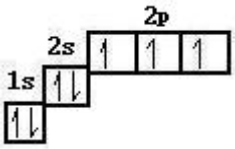
B. 

C. 

D. 

16. The orbital diagram drawn shows the electronic configuration of _____

A. chlorine.



B. nitrogen.

C. calcium.

D. neon.

17. All of the following elements except _____ exhibits an isotope.

A. $35_{17}Cl$ $^{37}_{17}Cl$

B. $^{1}_{1}H$ $^{2}_{1}H$ $^{3}_{1}H$

C. $^{12}_{6}C$ $^{13}_{6}C$

D. $^{14}_{17}N$ $^{14}_{17}N$

18. Which of the following is the correct shapes of all molecules?

[i] linear molecules

[ii] non-linear molecules

[iii] spherical molecule.

A. [ii] and [iii].

B. [i] and [ii].

C. [i] and [iii].

D. [i], [ii] and [iii].

19. The property of the element that varies in relation to their atomic masses is _____

A. periodicity.

B. periodic table.

C. periodic law.

D. none of the above.

20. Elements in the same group in the periodic table have the same _____

A. atomic mass.

B. valence electrons.

C. shells.

D. atomic number.

21. Hund's rule states that _____

A. two electrons in the same atom cannot have the same values for all four quantum numbers.

B. when electrons are to occupy the sub-orbitals of the same n and l values, the electrons would tend to occupy the orbitals singly until each orbital is occupied before pairing.

C. no two electrons in an atom can have all four quantum numbers n, l, m and ms identical.

D. when electrons occupy the sub-orbitals of the same n and l values, the electrons would tend to occupy an orbital by pairing.

22. The type of bond formed when two elements $_{17}X$ and $_{19}Y$ combine together is _____

A. covalent.

B. coordinate.

C. electrovalent.

D. hydrogen.

23. Which of the following option is not a type of intermolecular interactions?

A. Neutral molecular-neutral molecule interaction.

B. Neutral molecule-neutral molecule interaction.

C. Dipolar molecule-neutral molecule interaction.

D. Dipolar molecule-dipolar molecule interaction.

24. Sodium atoms and sodium ions _____

A. are chemically identical.

B. have the same number of electrons.

C. have the same number of protons.

D. react and form compounds with covalent bonds.

25. The first element of the periodic table is _____

A. hydrogen.

B. helium.

C. nitrogen.

D. oxygen.

26. The bond type between copper [ii] ions and water molecule is _____

A. electrovalent bond.

B. covalent bond.

C. dative covalent bond.

D. hydrogen bond.

27. _____ is the same for an element and its isotope.

A. Mass number

B. Number of neutrons

C. Number of protons and neutrons

D. Atomic number

28. What is the type of bond present in methane?

A. Covalent bond.

B. Ionic bond.

C. Coordinate covalent bond.

D. Metallic bond.

29. In the atomic notation ${}^{x}_{y}A$, _____

A. x is the atomic number of the element.

B. y is the atomic number of the element.

C. x is the number of protons in the element.

D. x is the number of electrons in the element.

30. Element X is in Group 1 of the periodic table. It is likely to be _____

A. a very reactive non-metal.

B. an element which readily forms X^- ions.

C. a dense hard metal with a high melting point.

D. a light, soft metal with a low melting point.

31. Ionic or electrovalent bonding occurs when _____

A. a metal or aluminium radical combine with a metal or radical.

B. two or more non-metals combine together.

C. a metal or ammonium radical combines with a non-metal or radical.

D. two or more non-metals combine together and one of the atom donates more of the electron.

32. From the electronic configuration$1s^2 2s^2 2p^6 3s^2 3p^5$,, determine the number of electrons in the outermost shell.

A. 7.

B. 5.

C. 2.

D. 8.

33. What is the maximum number of electron contained in the third shell?

A. 2.

B. 18.

C. 8.

D. 32.

34. When the energy needed to break up bonds is less than energy liberated on hydration of ions in an ionic compound, the compound is _____

A. Soluble.

B. Insoluble.

C. Hydrated.

D. None of the above.

35. If iron is denoted as 5626Fe, then the nucleus of the iron atom contains _____

A. 56 protons and 26 neutrons.

B. 30 protons and 26 neutrons.

C. 26 protons and 30 neutrons.

D. 28 protons and 28 neutrons.

36. If the atomic number of an element is 10, then the outermost shell will have _____electrons.

A. 2

B. 3

C. 8

D. 6

37. Rare gases are stable because they _____

A. are monatomic.

B. forms ions easily.

C. are volatile gases.

D. have duplet or octet electronic configurations in the outermost shells of their atoms.

38. What is the type of bond present in calcium oxide?

A. Covalent bond.

B. Metallic bond.

C. Ionic bond.

D. Coordinate covalent bond.

39. How many protons are there in a metallic ion (X^{3+}) which has an inert gas structure and contains 10 electrons?

A. 3.

B. 7.

C. 10.

D. 13.

40. The species that can donate electron pairs for complex formation with metal ions is called _____

A. hydrogen bond.

B. ligand.

C. covalent bond.

D. inter molecular forces.

41. The number of protons of an atom is the same as the _____

A. mass number.

B. atomic weight.

C. atomic number.

D. weight number.

42. The Uncertainty Principle states that _____

A. the position of the measure of the momentum of an electron can be known with certainty.

B. the position of the measure of the momentum of an electron cannot be known.

C. the position of the accurate measure of the momentum of an electron can be known with certainty.

D. the position of the accurate measure of the momentum of an electron cannot be known with certainty.

43. All of the following options are properties of ionic or electrovalent compounds except _____

A. ionic compounds are composed of two or more different kinds of oppositely charged ions.

B. ionic compounds, when molten or in aqueous solution, are electrolytes.

C. ionic compounds are usually soluble in water but do not dissolve in organic solvents.

D. ionic compounds are often insoluble in water but dissolve more readily in organic solvents.

44. If force is applied to an electrovalent/ionic crystal, _____

A. the shape will be deformed.

B. the shape will not be deformed.

C. the crystal will not be fractured.

D. the shape and the crystal structure will be deformed.

45. Which of the following pairs are allotropes?

A. Carbon [graphite] and Sulphur [monoclinic].

B. Carbon [diamond] and Sulphur [monoclinic].

C. Sodium chloride and caesium chloride.

D. Phosphorus [white] and Phosporus [red].

46. Co-ordinate (dative) bonding is formed _____

A. between atoms adjacent to each other in the periodic table.

B. when one of the participants possesses a lone pair of electrons.

C. between atoms that have the same number of valence electrons.

D. between atoms that can take part in transfer of electrons.

47. In going across period 3 [from sodium to argon] of the periodic table, it is noticed that _____

A. the first ionization energy increases.

B. the atomic size increases to the middle of the period and then decreases.

C. there is a gradual change in the oxides from basic to acidic [argon does not form an oxide].

D. there is a gradual decrease in electronegativity.

48. A phenomenon whereby atoms of an element exhibit different mass numbers but have the same atomic number is _____

A. isotropy.

B. atomic weight.

C. isotopes.

D. none of the above.

49. If X is a group III element, its oxide would be represented as _____

A. X_3O_2.

B. X_3O.

C. X_2O_3.

D. XO_3.

50. Which of the following species correctly represents an ion of M with 13 protons and 10 electrons

A. $_{10}M^{3+}$.

B. . $_{10}M^{3-}$.

C. $_{13}M^{3+}$.

D. $_{13}M^{3-}$. .

51. The simplest three-dimensional arrangement which is regularly repeated throughout a structure is _____

A. unit cell.

B. atom.

C. molecule.

D. electron.

52. What is the name of the scientist that discovered the neutron?

A. Chadwick.

B. J. J. Thomson.

C. John Dalton.

D. Niels Bohr.

53. Which element has an electronic configuration of $1s^2 2s^2 2p^6 3s^1$?

A. Calcium.

B. Chlorine.

C. Potassium.

D. Sodium.

54. A particle that contains 17 protons, 18 neutrons and 18 electrons is _____

A. a negative ion.

B. a neutral atom.

C. a positive ion.

D. an atom of a metal.

55. The element with atomic number 10 is likely to have similar properties to the element with atomic number _____

A. 9.

B. 11.

C. 16.

D. 18.

56. Bonds between a highly electronegative atom and a hydrogen from another molecule is called _____

A. hydrogen bond.

B. covalent bond.

C. inter molecular forces.

D. ligand.

57. Which of the following are properties of metallic bonding?

[i] They are solids at room temperature

[ii] They are ductile and malleable

[iii] They are good conductors of electricity

[iv] They are good conductors of heat.

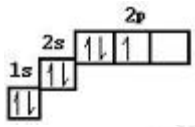
A. [i], [ii] and [iv].

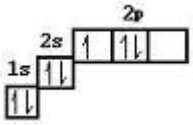
B. [ii], [iii] and [iv].

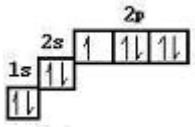
C. [i], [ii], [iii] and [iv].

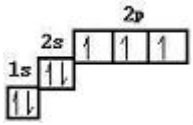
D. [i], [ii] and [iii].

58. Which of the following orbital diagrams best explains Hund's rule?

A. 

B. 

C. 

D. 

59. Compounds with high melting and boiling points is a result of strong _____

A. covalent bonds.

B. metallic bonds.

C. ionic bonds.

D. van der waals forces.

60. The sum of the protons and neutrons in an element is known as _____

A. atomic weight.

B. mass number.

C. atomic number.

D. weight number.

61. The atomic mass of an atom is mostly due to the mass of _____

A. electrons and neutrons.

B. electrons and protons.

C. positrons and neutrons.

D. protons and neutrons.

62. The type of bond between two atoms of an element with respective atomic number of 7, is _____

A. coordinate covalent.

B. covalent.

C. hydrogen.

D. ionic.

63. In electrovalency, valence electrons are transferred and the atomic number is _____

A. also reduced.

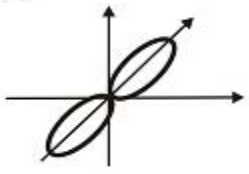
B. stabilized.

C. unaffected.

D. destabilized.

Use the diagram to answer the question.

64. The diagram drawn shows the shape of _____ orbital.



A. d

B. p

C. sp2

D. sp3

65. Which of the following elements has the highest electronegativity?

A. Chlorine.

B. Fluorine.

C. Nitrogen.

D. Oxygen.

66. **Which of the following elements exhibits the same chemical properties as the atom $^{35}_{17}X$?**

A. An element with atomic number 17.

B. An element with atomic number 18.

C. An element with mass number 35.

D. An element with mass number 52.

67. Which of the following statements is true about a closed container at s.t.p. which contains 11 g of P (carbon dioxide) and 8 g of Q (oxygen)?

A. The average kinetic energy of P is higher than the average kinetic energy of Q.

B. The partial pressure of P is higher than the partial pressure of Q.

C. The partial pressure for each gas becomes 0.5 atm when 1 dm 3of P is mixed with 1 dm3of Q.

D. P and Q do not contain the same number of molecules.

68. Carbon has three isotopes, 126C,136C and 146C. If the relative abundance of these isotopes are 80%, 16%, and 4% respectively, the atomic mass of carbon will be _____

A. 12.00.

B. 12.50.

C. 12.10.

D. 12.24.

69. _____is the type of bond present in a diatomic nitrogen gas.

A. double covalent bond.

B. triple covalent bond.

C. single covalent bond.

D. double electrovalent bond.

70. Isotopes are atoms of the same element which have _____

A. the same mass number but different atomic numbers.

B. the same mass number and the same atomic number.

C. the same number of neutrons but different numbers of protons.

D. the same number of protons but different numbers of neutrons.

TOPIC: ATOMS. MOLES. FORMULAE. EQUATIONS

DIRECTION: Choose the correct answer from the lettered options.

1. How many moles of potassium is needed to balance the given equation below?

$Fe[NO_3]_3(aq) + KSCN(aq) \rightarrow Fe[SCN]_3(aq) + KNO_3(aq)$

A. 2.

B. 4.

C. 1.

D. 3.

2. The number of times the average mass of one atom of that element is heavier than one-twelfth the mass of one atom of carbon-12 is known as _____

A. relative molecular weight.

B. relative atomic weight.

C. relative molecular mass.

D. relative atomic mass.

3. How many moles are there in 20g of ammonium trioxocarbonate [iv]?

A. 0.213 moles.

B. 0.260 moles.

C. 0.208 moles.

D. 0.280 moles.

4. What is atomic mass unit of sulphur?

A. 23 amu.

B. 35.5 amu.

C. 32 amu.

D. 16 amu.

5. 6g of metal M react completely with 23.66g of chlorine to form 29.66g of the metallic chloride. Find the empirical formula of the metallic chloride.

[M = 27, Cl = 35.5]

A. MCl.

B. MCl_3.

C. MCl_2.

D. M_3Cl.

6. Compounds which have the same molecular formular but different arrangements of atoms are called _____

A. polymers.

B. isomers.

C. isotopes.

D. allotropes.

7. From the equation given below

$CNH_3[g] + BO_2[g] \rightarrow DNO[g] + AH_2O[g]$,

the value of D is _____

A. 3.

B. 5.

C. 4.

D. 6.

8. What is the mass of 3 moles of oxygen atom?

A. 48.

B. 96.

C. 24.

D. 16.

9. Which of the following options correctly balances the equation given below?

$Cu_2S[s] + O2[g] \rightarrow Cu_2O[s] + SO_2[g]$.

A. $2Cu_2S_{[s]} + 4O_{2[g]} \rightarrow 2Cu_2O_{[s]} + 2SO_{2[g}$

B. 2Cu2S[s] + 2O2[g] → 2Cu2O[s] + 2SO2[g].

C. $2Cu_2S_{[s]} + 3O_{2[g]} \rightarrow 2Cu_2O_{[s]} + 2SO_{2[g]}$.

D. Cu2S[s] + O2[g] → Cu2O[s] + SO2[g].

10. An atom is _____

A. the smallest particle of an element which can take part in a chemical reaction.

B. the smallest particle which can take part in a chemical reaction.

C. the smallest particle which can take part in a reaction.

D. the smallest particle which can take part in a physical reaction.

11. What is atomic mass unit of fluorine?

A. 19 amu.

B. 40 amu.

C. 31 amu.

D. 39 amu.

12. Find the relative molecular mass of ammonium trioxocarbonates [IV].

A. 94.

B. 96.

C. 77.

D. 78.

13. To balance the equation given below;

$NH_{3(g)} + Cl_{2(g)} \rightarrow N_{2(g)} + NH_4Cl_{(s)}$

we need to add _____

A. 2 before NH3 and 2 before NH_4Cl.

B. 4 before NH3, 2 before Cl_2, and 2 before NH_4Cl.

C. 6 before NH3, 2 before Cl_2, and 3 before NH_4Cl.

D. 8 before NH3, 3 before Cl_2, and 6 before NH_4Cl.

14. From the equation given below

$XNH_{3[g]} + YO_{2[g]} \rightarrow ZNO_{[g]}$

the value of Z is ____

A. 4.

B. 7.

C. 6.

D. 5.

15. The atomic number of an element, M, is 13. That of another element, N, is 8. M and N form a compound of formula _____

A. MN.

B. MN_2.

C. M_2N.

D. M_2N_3.

16. The major difference between

SO3 and

SO32- is that _____

A . SO_3 is a molecule while SO_3^{2-} is an atom.

B. SO_3 is a radical while SO_3^{2-} is a molecule

C. SO_3 is a molecule while SO_3^{2-} is a radical.

D. SO_3 is a radical while SO_3^{2-} is an atom.

17. The number of particle 0.2 moles of a substance contain _____

A. 1.204×10^{23}atoms.

B. 1.204×10^{23}particles.

C. 12.04×10^{23}particles.

D. 12.04×10^{23}atoms.

18. Which of the following best explains matter?

[i] Atoms

[ii] Molecules

[iii] Ions.

A. [i] and [ii] only.

B. [ii] only.

C. [i], [ii], and [iii].

D. [ii] and [iii] only.

19. The empirical formular of C_6H_6 is _____

A. CH.

B. C_3H_3.

C. C_6H_6.

D. 3CH.

20. A molecule of neon is _____

A. diatomic.

B. ionic.

C. triatomic.

D. monatomic.

21. Atomicity of ozone is _____

A. 1.

B. 2.

C. 3.

D. 4.

22. One mole of oxygen atoms _____

A. has a molar mass of 32g.

B. has 6.02×10^{23} molecules

C. can be represented as O_2.

D. contains Avogadro's number of atom.

23. How many atoms are contained in 1 mole of hydrogen molecule?

A. 18.09×10^{23}atoms.

B. 12.06×10^{23}atoms.

C. 6.02×10^{23}atoms.

D. 6.02×10^{23}molecules.

24. What is a radical?

A. Group of atoms of an element which acts as a single compound in a reaction.

B. Group of atoms which acts as a single unit in a chemical reaction

C. Group of atoms of an element which acts as a single element in a reaction.

D. Group of atoms of a compound which acts as a single unit in a molecular formula.

25. The modern standard element with which chemists define relative atomic mass is _____

A. ^{12}C.

B. ^{13}C.

C. ^{3}H.

D. ^{14}C.

26. Find the number of moles of a substance which contains 3.01×10^{22} electrons.

A. 20 moles.

B. 0.5 moles.

C. 0.05 moles.

D. 5 moles.

27. The number of atoms in each molecule of an element is called _____

A. element.

B. atoms.

C. ions.

D. atomicity.

28. A molecule is the smallest particle of _____

A. a matter that can exist in Free State.

B. an element that can exist in Free State.

C. a radical that can exist in Free State.

D. a lattice that can exist in Free State.

29. The atomic mass of hydrogen had to change from 1.00 to 1.008 when _____

A. more sensitive balances were manufactured.

B. the standard of reference became C12 isotope.

C. the figure was corrected to three significant figures.

D. the phenomenon of isotopy was discovered.

30. The percentage by mass of lead in lead [II] trioxonitrate [V] is _____

[Pb = 108; N = 14; O = 16]

A. 46.55%.

B. 12.07%.

C. 41.38%.

D. 64.55%.

31. How many atoms are there in 4g of carbon?

A. 2.01×10^{22}.

B. 2.01×10^{21}.

C. 2.01×10^{24}.

D. 2.01×10^{23}.

32. If the relative molecular mass of CH2O is 60, its empirical formular is _____

A. 4.

B. 1.

C. 2.

D. 3.

33. The law that states that all pure samples of a particular chemical compound contain similar elements combined in the same proportion by mass is _____

A. the law of conservation of mass.

B. the law of definite proportions.

C. the law of chemical combination.

D. the law of multiple proportions.

34. 0.0045 moles would contain _____ amount of electrons.

A. 2.709×10^{12}particles

B. 2.709×10^{21}atoms

C. 2.709×10^{21}electrons

D. 27.09×10^{21}electrons

35. From the equation below,

$NH_3(g) + O_2(g) \rightarrow H_2O(g) + N_2(g)$,

Find the number of moles of N_2 that is yielded when 34g of NH_3 reacts with oxygen.

A. 2 moles.

B. 1 mole.

C. 4 moles.

D. 3 moles.

36. The atomic mass unit is equal to the relative atomic mass.

A. False.

B. True.

C. The atomic mass unit has no unit.

D. All of the above.

37. The numerical coefficient in a balanced equation gives _____

A. the number of moles of reactants and products.

B. the molar mass of the reactants and products.

C. the number of moles of reactants only.

D. the number of molecules and atoms of products only.

38. From the equation given below

$CNH_3[g] + BO_2[g] \rightarrow DNO[g] + AH_2O[g]$,

the value of C is _____

A. 5.

B. 4.

C. 3.

D. 6.

39. 1 mole of a substance contains _____

A. 6.02×10^{23}atoms.

B. 6.02×10^{23}electrons.

C. 6.02×10^{23}particles.

D. 6.02×10^{-23}particles.

40. What is molar mass?

A. The mass of one atom of a substance expressed in grams.

B. The mass of one molecule of a substance expressed in grams.

C. The mass of one mole of a substance expressed in grams.

D. The weight of one mole of a substance expressed in grams.

41. A certain compound on analysis yielded 6g carbon, 1g hydrogen and 8g oxygen. If the relative molecular mass of the compound is 60, its molecular formula is _____.

[C = 12, H = 1, O = 16]

A. CH_3COOH.

B. CH_3COH.

C. CH_3OH.

D. CH_3CO.

42. Determine the empirical formula of a compound that contains 62.54% of lead, 8.46% of nitrogen and 29.00% of oxygen by mass.

[Pb = 207, N = 14, O = 16]

A. $PbNO_3$.

B. PbN_2O_3.

C. $Pb[NO_3]_2$

D. $Pb[NO_3]_3$.

43. Which of the following statements about the number of atoms they contain is true?

(i) one mole of hydrogen.

(ii) one mole of oxygen.

(iii) one mole of water.

A. (i)>(ii)>(iii).

B. (ii)>(i)>(iii).

C. (i) = (ii) = (iii).

D. (iii)>both (i) & (ii), but (ii) = (i).

44. The law which states that matter is neither created nor destroyed during chemical reaction but changes from one form to another is the _____

A. law of chemical combination.

B. law of multiple proportions.

C. law of conservation of mass.

D. law of definite proportions.

45. From the equation given below

$CNH_3[g] + BO_2[g] \rightarrow DNO[g] + AH_2O[g]$,

the value of B and A is _____

A. 3 and 5.

B. 4 and 6.

C. 6 and 5.

D. 5 and 6.

46. The percentage of oxygen in sulphur [IV] oxide [S = 32, O = 16] is _____

A. 5%.

B. 50%.

C. 52%.

D. 25%.

47. The number of moles of a substance which contains 0.0285×10^{25} atoms is _____

A. 2.1 moles.

B. 4.7 moles.

C. 0.047 moles.

D. 0.47 moles.

48. In $3Al_2(SO_4)_3$ there are _____

A. 3 atoms of Al, 3 atoms of S, and 4 atoms of O.

B. 2 atoms of Al, 3 atoms of S, and 4 atoms of O.

C. 6 atoms of Al, 3 atoms of S, and 12 atoms of O.

D. 12 atoms of Al, 9 atoms of S, and 12 atoms of O.

49. A substance containing as many elementary entities as the number of atoms in exactly 12 grams of carbon-12 is called _____

A. mole.

B. molecule.

C. atomic mass unit.

D. Avogadro's number.

50. The relative number of atoms in a compound is called _____

A. atomic number.

B. Avogadro number.

C. empirical formula.

D. molecular formula.

51. Four of the following substances have something in common, which is the odd one?

A. Nickel.

B. Copper.

C. Sulphur.

D. Sodium.

52. The following are examples of radicals except _____

A. OH.

B. NH_3.

C. CO_3.

D. NH_4.

53. Which of the following compound is heavier?

(i) 1 mole of Pbd_4

(ii) 1 mole of H_2 and

(iii) 1 mole of $Pb[NO_3]_2$

A. (ii) only.

B. (i) & (ii) only.

C. None of them.

D. (i), (ii) & (iii).

54. Find the percentage by mass of nitrogen in potassium trioxonitrate [v].

[K = 39; N = 14; O = 16]

A. 47.5%.

B. 13.9%.

C. 38.6%.

D. 19.3%.

55. $3H_2O(l)$ is _____

A. three moles of water.

B. three moles of steam.

C. six moles of water.

D. six moles of steam.

56. The number of times the average mass of one molecule of it is heavier than one-twelfth the mass of one atom of carbon-12 is known as _____

A. relative atomic mass.

B. relative molecular mass.

C. relative molecular weight.

D. relative atomic weight.

57. The molar masses of compounds in the same homologous series differ by _____

A. 4 atomic mass units.

B. 8 atomic mass units.

C. 10 atomic mass units.

D. 2 atomic mass units.

TOPIC: BONDING

DIRECTION: Choose the correct answer from the lettered options.

1. Water has a rather high boiling point despite its low molecular mass because of the presence of _____

A. hydrogen bonding.

B. covalent bonding.

C. ionic bonding.

D. metallic bonding.

2. The molecule having one unpaired electron is _____.

A. NO

B. CO

C. CN^-

D. O_2

3. The shape of ammonia molecule is _____

A. trigonal planar.

B. octahedral.

C. square planar.

D. tetrahedral.

4. Which of the following is the correct order of decreasing activity of the metals Fe, Ca, Al and Na?

A. Fe > Ca > Al > Na.

B. Na > Ca > Al > Fe.

C. Al > Fe > Na > Ca.

D. Na > Ca > Fe > Al.

5. All molecules with polar bonds have dipole moment.

A. False

B. True

6. The valence atomic orbitals of carbon in silver acetylide is _____.

A. sp

B. sp^2

C. sp^3

D. spd

7. Two or more atoms combine to form _____

A. a molecule.

B. an anion.

C. an ion.

D. a cation.

8. Inert gases do not react with any other element because _____

A. the pressure is not high enough.

B. their outermost electron level is filled with 8 electrons.

C. the temperature is not high enough.

D. their nucleus is very small.

9. What is the bonding in C_2H_2?

A. ionic

B. dative

C. covalent

D. hydrogen

10. The hybridization of sulphur dioxide is _____.

A. sp

B. sp^2

C. dsp^2

D. sp3

11. Which of the following best describes why water has a higher boiling point than ammonia?

A. The water molecule is bigger than the ammonia molecule.

B. Water molecules have stronger dispersion forces than ammonia molecules.

C. Water molecules have dipole-dipole forces whereas ammonia molecules have dispersion forces.

D. Water molecules have stronger dipole-dipole forces than ammonia molecules.

12. NaCl is an _____.

A. magnetic compound

B. ionic compound

C. hybrid compound

D. covalent compound

13. _____ hybrid orbitals of nitrogen are involved in the formation of ammonium ion.

A. sp^3

B. sp

C. sp^2

D. sp^3d

14. Which of the following substances is a molecular substance?

A. Aluminium.

B. Graphite.

C. CO_2.

D. Sodium chloride.

15. Atoms take part in bond formation to _____

A. neutralize their charge.

B. increase their energy.

C. increase their charge density.

D. attain a stable electronic configuration.

16. When N_2 goes to N_2+, the N-N bond distance _____ and when O_2 goes to O_2+, the O-O bond distance _____.

A. increases, increases

B. decreases, increases

C. decreases, decreases

D. increases, decreases

17. $SnCl_2$ is nonlinear molecule?

A. True

B. False

18. The bonds present in N_2O_5 are _____

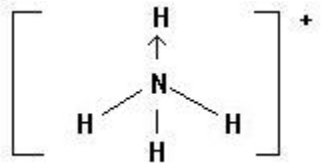
A. only ionic

B. covalent and coordinate

C. only covalent

D. covalent and ionic

19. What type of bond is indicated by the arrow in the following structure?



A. Covalent bond.

B. Ionic bond.

C. Dative bond.

D. Hydrogen bond.

20. Which of the following compounds is ionic?

A. H_2O.

B. NaCl.

C. HCl.

D. CH_4.

21. Metals are said to be malleable because they _____

A. are good conductors of heat.

B. are good conductors of electricity.

C. can be beaten into sheets.

D. can be alloyed.

22. There are _____ p (pi) bonds in a nitrogen molecule.

A. 1

B. 3

C. 2

D. 0

23. Linear overlap of two atomic p-orbitals leads to a sigma bond.

A. False

B. True

24. sp^2 hybrid orbitals have equal s and p character.

A. True

B. False

25. Electrovalent compounds are characterized by _____

A. solubility in ethanol.

B. high molar mass.

C. high melting point.

D. strong oxidizing agent.

26. On the hybridization of one s and one p orbitals, we get _____.

A. Two mutually perpendicular orbitals

B. Two orbital at 180°

C. Four orbitals directed tetrahedrally

D. Three orbital in a plane

27. In P_4O_{10}, the number of oxygen atoms bonded to each phosphorus atom is _____.

A. 2

B. 4

C. 3

D. 5

28. _____ and _____ are the types of bonds present in $CuSO_4.5H_2O$.

A. electrovalent and covalent

B. electrovalent and coordinate covalent

C. electrovalent, covalent and coordinate covalent

D. covalent and coordinate covalent

29. In which of the following substances are dispersion forces the main intermolecular forces at room temperature?

A. Chromium.

B. Diamond.

C. Iodine.

D. Potassium chloride.

30. The bond between two identical non-metal atoms has a pair of electrons _____.

A. unequally shared between the two

B. transferred fully from one atom to another

C. with identical spins

D. equally shared between them

31. The hydrogen bond is strongest in _____.

A. O-H.....S

B. S-H.....O

C. F-H.....S

D. F-H...O

32. A chemical bond formed by sharing of electrons is a _____

A. electrostatic bond.

B. polyatomic bond.

C. ionic bond.

D. covalent bond.

33. Which of the following is not true of metals?

A. They are good conductors of electricity.

B. They ionize by electron loss.

C. Their oxides are acidic.

D. They have high melting points.

34. Which of the following statements is true?

A. H_2O has a greater dipole moment than H_2S.

B. H_2O is polar, but H_2S is non-polar.

C. The molecules H_2S and H_2O are both linear.

D. The molecules H_2S and H_2O both have zero dipole moment.

35. In an ionic bond, the two elements _____

A. borrow electrons.

B. exchange electrons.

C. polarize electrons.

D. share electrons.

36. Which of the following terms indicates the number of bonds that can be formed by an atom?

A. Oxidation number.

B. Atomic number.

C. Valence.

D. Electronegativity.

37. Which of these options does not have the hydrogen bond?

A. Phenol

B. Liquid NH_3

C. Water

D. Liquid HCl

38. The shape of $[CH_3]+$ is _____.

A. coplanar

B. tetrahedral

C. linear

D. triangular planar

39. How many double bonds are there in a molecule of SF_2?

A. 1

B. 2

C. 3

D. none

40. Element X, with electronic configuration 2,8,2 and element Y with electronic configuration 2,8,7 are likely to combine by _____

A. metallic bonding.

B. covalent bonding.

C. electrovalent bonding.

D. dative bonding.

41. Dipole moment of CH_3F is greater than CH_3Cl.

A. True

B. False

42. Carbon tetrachloride has no net dipole moment because of _____

A. its planar structure.

B. its regular tetrahedral structure.

C. similar sizes of carbon and chlorine atoms.

D. similar electron affinities of carbon and chlorine.

43. A chemical bond formed by exchange of electrons is called _____

A. an ionic bond.

B. a hydrate bond.

C. a magnetic bond.

D. a covalent bond.

44. How many electrons are required in the outermost shell of an element for it to be stable?

A. 4

B. 2

C. 8

D. 6

45. What is responsible for metallic bonding?

A. Sharing of electrons between the metal atoms.

B. Attraction between the atomic nuclei and cloud of electrons.

C. Transfer of electrons from one atom to another.

D. Attraction between positive and negative ions.

46. Ionic crystals are crystals with repeating unit of anions and cations. Which of the following is generally true of ionic crystals?

A. They have low melting points.

B. They have high melting points.

C. Their solids are poor electrical conductors, while the liquids or solutions conduct electricity.

D. b and c only.

47. There is a large temperature interval between the melting point and the boiling point of a metal because _____

A. metals have very high melting points.

B. metals conduct heat very rapidly.

C. melting does not break the metallic bond but boiling does.

D. all of the above.

48. The ion that is isoelectronic (same number of electrons) with CO is _____.

A. CN^-

B. $O2^+$

C. $O2^-$

D. $N2^+$

49. The name of the compound with the formula KCl is _____.

A. Chloride Potassium

B. Chlorate Potassium

C. Potassium Chloride

D. Potassium Chlorate

50. Which of the following types of hybridization gives rise to tetrahedral molecules?

A. sp

B. sp^2

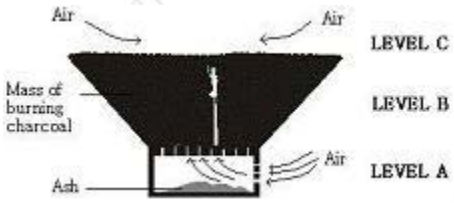
C. sp^3

D. sp^3d

TOPIC: CARBON AND ITS COMPOUNDS

DIRECTION: Choose the correct answer from the lettered options.

1. The diagram shows the stages of combustion of charcoal, the equation of reaction of level A is _____



A. $C + O_2 \rightarrow CO_2$.

B. $CO_2 + C \rightarrow 2CO$.

C. $2CO + O_2 \rightarrow 2CO_2$.

D. $CO + CO_2 \rightarrow 2CO_2$.

2. One mole of a compound M(HCO3) has a mass of 162g, the relative atomic mass of M is _____.

[H = 1, C = 12, O = 16]

A. 122g.

B. 101g.

C. 53g.

D. 40g.

3. Water gas is a mixture of equal volumes of _____

A. hydrogen and carbon [IV] oxide.

B. nitrogen and carbon [II] oxide.

C. hydrogen and carbon [II] oxide.

D. nitrogen and carbon [IV] oxide.

4. Where else is CO_2 found in Free State apart from the atmosphere?

A. In carbonated trees.

B. Dissolved form in water.

C. In corals.

D. In limestone region.

5. Which of the following processes are used to improve the yield and quality of petrol?

(I) Cracking

(II) Catalytic reforming

(III) Use of additives

(IV) Fractional distillation

A. I & II

B. III & IV

C. I, II & III

D. I, II, III & IV

6. Kipp's apparatus is an instrument for preparing intermitent supply of gases by reacting _____

A. liquid with gas.

B. liquid with solid.

C. solid with gas.

D. liquid with liquid.

7. 9.60g of a gas X occupies the same volume as 0.30g of Hydrogen under the same conditions, the molar mass of X is _____.

[H = 1]

A. 8gmol-1.

B. 16gmol-1.

C. 32gmol-1.

D. 64gmol-1.

8. What volume of hydrogen is produced when 2.60g of zinc reacts with excess HCl according to the following equation?

$Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$

A. 0.40dm^3.

B. 0.896$dm^{3.}$

C. 5.82$dm^{3.}$

D. 8.62$dm^{3.}$

9. On exposing palm-wine to air for some days, it becomes sour owing to the conversion of _____

A. glucose to ethanol.

B. glucose to glycolic acid.

C. ethanol to ethanoic acid.

D. ethanoic acid to ethanol.

10. Which carbon material is the hardest substance known?

A. Graphite.

B. Stone.

C. Diamond.

D. Anthracite.

11. Producer gas is a mixture of _____

A. nitrogen and carbon [IV] oxide.

B. hydrogen and carbon [II] oxide.

C. hydrogen and carbon [IV] oxide.

D. nitrogen and carbon [IV] oxide.

12. Octane number is highest in petrol containing a high proportion of _____

A. 2,2,4-trimethylpentane.

B. octane.

C. 2-methylpentane.

D. 2,4-dimethylpentane.

13 The liquid product of the destructive distillation of coal is _____

A. ammoniacal liquor.

B. coal gas.

C. pyroligneous acid.

D. wood fume.

14. Carbon occurs naturally as _____

A. charcoal and Soot.

B. diamond and Graphite.

C. diamond and Soot.

D. charcoal and Graphite.

15. Wood → Wood charcoal + Pyroligneous acid + Wood tar + Wood gas.

Which of the following correctly represents the equation given above?

A. Destructive distillation of coal.

B. Destructive distillation of coke.

C. Destruction distillation of charcoal.

D. Destructive distillation of wood.

16. A form of carbon used for absorbing poisonous gases and purification of noble gases is _____

A. wood charcoal.

B. animal charcoal.

C. carbon fibre.

D. carbon black.

17. Esters are employed in the following except _____

A. making perfumes.

B. making cement.

C. making solvents for cellulose trioxonitrate (V).

D. nail varnishes

18. The chemistry of carbon compounds is known as _____

A. inorganic chemistry.

B. carbon compounds.

C. organic chemistry.

D. all of the above.

19. Which of these is not a reaction of combustion of charcoal?

A. $C + O_2 \rightarrow CO_2$.

B. $CO_2 + C \rightarrow CO$

C. $2CO + O2 \rightarrow 2CO_2$.

D. $CO_2 + CO \rightarrow 2CO$.

20. Which of the statements is true about carbon (IV) oxide?

A. It supports combustion.

B. It is strongly acidic.

C. It is very soluble in water.

D. It supports the burning of magnesium to produce magnesium oxide.

21. The form of carbon used in making printer's ink is _____

A. animal charcoal.

B. lampblack.

C. wood charcoal.

D. soot.

22. What are the impurities present in the formation of coal?

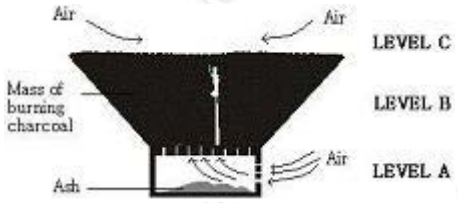
A. Nitrogen, Calcium and Phosphorus.

B. Nitrogen, Silicon and Phosphorus.

C. Nitrogen, Sodium and Phosphorus.

D. Nitrogen, Sulphur and Phosphorus.

23. When charcoal burns in an unlimited supply of air as shown in the diagram drawn, the carbon [IV] oxide produced moves up the charcoal and burns to carbon [II] oxide, which option best explains the process?



A. Carbon [II] oxide has been reduced.

B. Carbon [IV] oxide has been reduced.

C. Carbon [IV] oxide has been oxidized.

D. All of the above.

24. Which statement is true about these two gases?

A. Both gases give a milky precipitate when bubbled into limewater.

B. Carbon monoxide is an element and carbon dioxide is a compound.

C. Only carbon monoxide gas is toxic to animals.

D. Neither compound will burn in air.

25. Which of the following properties of diamond is not correct?

[i] It has a high melting point.

[ii] It is very dense and resistant to high temperatures and chemical attack.

[iii] Non - conductor of electricity.

[iv] It has a density of 2.3g cm^{-3}..

A. [i] and [iii] only.

B. [iii] only.

C. [iv] only.

D. [i] and [ii] only.

26. Destructive distillation of coal implies _____

A. heating coal in air to liberate energy for industries.

B. wasting coal by using it as a domestic source of heat.

C. heating coal in a limited supply of air.

D. heating coal with hydrogen to produce hydrocarbons.

27. During fractional distillation, hydrocarbons are separated according to their _____

A. boiling points.

B. melting points.

C. triple points.

D. saturation points.

28. The formula CH_2O for ethanoic acid is regarded as it's _____

A. general formula.

B. structural formula.

C. molecular formula.

D. empirical formula.

29. Which of the following hydrocarbons is not likely to be present in petrol?

A. $C_{14}H_{20}$.

B. $C_{10}H._{22}$

C. C_9H_{20}.

D. C_7H_{16}.

30. Which of the following option gives the different types of coal?

A. anthracite, bituminous coal, lignite and peat.

B. anthracite, bituminous coal, coke and lignite.

C. anthracite, coke, lignite and peat.

D. anthracite, bituminous coal, coke and peat.

31. Acheson process is a process of producing _____

A. graphite from coke at high temperature.

B. coke using graphite at high temperature.

C. anthracite from carbon.

D. wood-charcoal from coal.

32. The liquid product of the destruction distillation of wood is _____

A. ammoniacal liquor.

B. pyroligneous acid.

C. coal fume.

D. wood gas.

33. Which of the following is a property of carbon (II) oxide?

A. The gas burns with a pale blue flame forming carbon (iv) oxide.

B. It is a good reducing agent.

C. It reacts with certain metals to form carbonyls.

D. All of the above.

34. The phenomenon whereby carbon atoms bonded together to form long chains or rings is known as _____

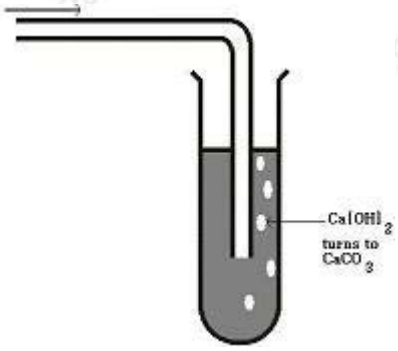
A. catenation.

B. decarbonisation.

C. carbonisation.

D. allotropy.

35. The diagram drawn is an illustration for _____



A. esting the presence of carbon [II] oxide.

B. testing the presence of calcium chloride.

C. testing the presence of carbon [IV] oxide.

D. testing the burning of carbon [II] oxide.

36. The physical properties of carbon [IV] oxide include the following except _____

A. colourless, tasteless and odourless.

B. it changes damp litmus paper pink.

C. it is about 1.5 times denser than air.

D. it is soluble in water.

37. A homologous series is one in which _____

(I) all compounds can be represented by one general formula.

(II) successive members differ from one another by CH2.

(III) physical properties differ only in terms of the number of carbon atoms per mol.

(IV) (I) and (II)

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

38. Which of the following options is not a type of charcoal?

A. Wood charcoal.

B. Sugar charcoal.

C. Animal charcoal.

D. Carbon charcoal.

39. Gas which dissolves in ammoniacal copper [I] chloride but is insoluble in water is _____

A. NH_3.

B. CO.

C. N_2O.

D. CO_2.

40. The crystal layers of graphite are held together by _____

(I) ionic bonds.

(II) dipole bonds.

(III) electrostatic bonds

(IV) van der Waal's forces.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

41. Which of these compounds is used to test the presence of carbon (IV) oxide gas?

A. CaO.

B. $Ca(OH)_2$.

C. Na_2CO_3.

D. NaOH.

42. In the preparation of carbon [IV] oxide _____ is used to remove water vapour.

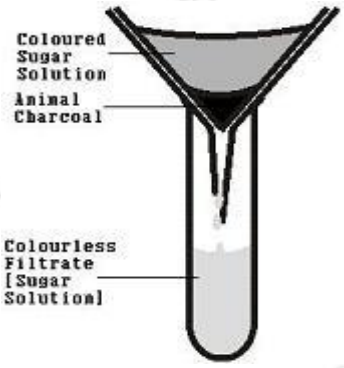
A. fused calcium oxide

B. fused calcium hydroxide

C. fused calcium trioxocarbonate [IV]

D. fused calcium chloride

43. The diagram drawn is an illustration to _____



A. investigate the ability of wood charcoal to adsorb gases.

B. study the reducing action of carbon.

C. investigate the ability of bone charcoal to adsorb colouring matter.

D. investigate the destructive distillation of wood.

44. The following options are types of fuel gases except _____

A. natural gas and producer gas.

B. water gas and natural gas.

C. producer gas and water gas.

D. A and B.

45. Which of the following statements about graphite and diamond is true?

A. They have the same crystal lattice structure.

B. They have the same degree of hardness.

C. They have the same electrical conductivity.

D. They can undergo the same chemical reactions.

46. Which substance is most likely to be formed in the incomplete burning of fuel?

A. water

B. carbon dioxide

C. carbon monoxide

D. all of the above

47. The property of graphite that makes it a good lubricant is its _____

A. low melting point.

B. low density.

C. electrical conductivity.

D. softness.

48. Find the mass of $ZnSO_4$ produced when excess of $ZnCO_3$ is added to $50.0cm^3$ of 4.00 $moldm^{-3}$ H_2SO_4.

The equation for the reaction is given below;

$ZnCO_3 + H_2SO_4 \rightarrow ZnSO_4 + CO_2 + H_2O$

[$ZnSO_4$ = 161gmol-1]

A. 0.200g.

B. 1.29g.

C. 32.2g.

D. 39.0g.

49. Cracking is a process _____

A. in which an alkene adds on itself repeatedly to form long chain polymers.

B. in which large hydrocarbon molecules are broken into smaller units.

C. for measuring the octane number of petrol.

D. in which carbon chain results in a zig-zag arrangement.

50. Cis-butanedioic acid and trans-butanedioic acid have the same _____

(I) physical properties.

(II) spatial arrangement.

(III) relative molecular mass.

(IV) functional groups.

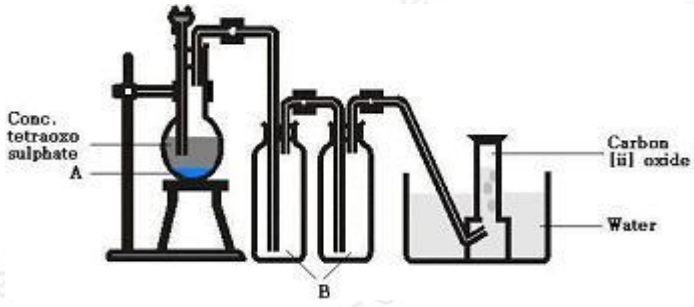
A. I & II.

B. III & IV.

C. I, II & III.

D. I, III & IV.

51. The diagram drawn is an illustration of the experiment for the _____



A. preparation of carbon (IV) oxide from ethene.

B. preparation of carbon (II) oxide from ethene.

C. preparation of carbon (IV) oxide from ethanedioic acid.

D. preparation of carbon (II) oxide from ethanedioic acid.

52. The phenomenon where two or more compounds have the same molecular formular but different molecular structures is known as _____

A. hybridization.

B. isomerism.

C. allotropy.

D. isotopy.

53. The constituents of water gas are _____ and _____

A. carbon (II) oxide and hydrogen.

B. carbon (II) oxide and nitrogen.

C. hydrogen and oxygen.

D. hydrogen and water vapour.

54. Which of the following is suitable for determining different isotopes present in an element which exhibits isotopy?

A. Sensitive weighing balance.

B. Cathode ray tube.

C. Mass spectrometer.

D. Geiger muller counter.

55. Which of the following trioxocarbonates [IV] are not decomposed by heat?

A. Calcium and sodium trioxocarbonates[IV].

B. Potassium and zinc trioxocarbonates[IV].

C. Sodium and potassium trioxocarbonates [IV].

D. Magnesium and potassium trioxocarbonates [IV].

56. Which of the following gases is colourless, odourless and soluble in KOH solution?

A. CO_2.

B. HCl.

C. NH_3.

D. NO_2.

57. During the preparation of carbon [ii] oxide, sodium hydroxide is used to remove _____

A. acid fumes.

B. water vapour.

C. unreacted carbon [II] oxide.

D. unchanged carbon [IV] oxide.

58. Which of the following pairs are allotropes?

(I) Water and hydrogen peroxide.

(II) Coal tar and coal gas.

(III) Diamond and graphite.

(IV) Rhombic sulphur and monoclinic sulphur.

A. I & II.

B. II, III & IV.

C. I, II & III.

D. I, II, III & IV.

59. Which of the following substances is a constituent of fire extinguisher?

A. Ammonia.

B. Carbon (IV) oxide.

C. Hydrogen sulphide.

D. Nitrogen (IV) oxide.

60. A gaseous metallic chloride MClx, consists of 20.22% of M by mass. The formula of the chloride is _____

[M = 27, Cl = 35.5]

A. MCl.

B. MCl_2.

C. MCl_3.

D. M_2Cl_6.

61. Producer gas is a gas with low heating power because it contains more _____

A. CO_2 than O_2.

B. Nitrogen than Carbon [II] oxide.

C. CO_2 than nitrogen.

D. Nitrogen than CO_2.

62. Gas prepared by the reaction between methane acid and concentrated tetraoxosulphate [VI] acid is _____

A. SO_2.

B. CO.

C. CO_2.

D. $H2_S$.

63. When graphite is subjected to a very high temperature and pressure for several hours in the presence of catalyst nickel, the product is _____

A. soot.

B. quartz.

C. artificial diamond.

D. graphite flakes.

64. What percentage of carbon [IV] oxide is found in the atmosphere?

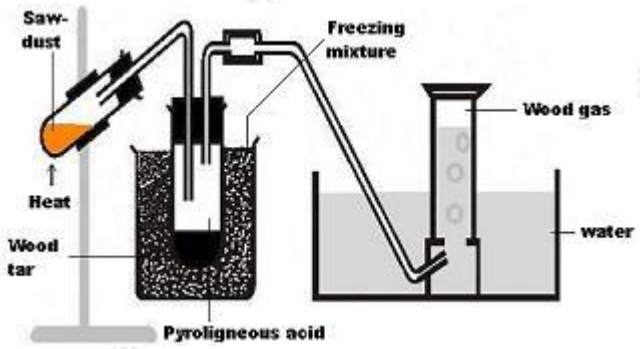
A. 0.03%.

B. 0.3%.

C. 3%.

D. 0.003%.

65. The diagram drawn is an illustration to _____



A. investigate the destructive distillation of wood.

B. investigate the destructive distillation of coal.

C. preparation of carbon [iv] oxide.

D. study the reducing action of carbon.

66. Which of the following option is the order of the products produced during heating of coal in the absence of air?

A. Coal → Coke + Ammoniacal liquor + Coal tar + Coal gas.

B. Coal → Ammoniacal liquor + Coal tar + Coke + Coal gas.

C. Coal → Coal gas + Coal tar + Ammoniacal liquor + Coke.

D. Coal → Coke + Coal tar + Ammoniacal liquor + Coal gas.

67. Water gas is a mixture of _____ and _____.

A. CO_2 and H_2

B. CO and H_2O

C. CO_2 and CO

D. CO and H_2

68. Which of these pairs are synthetic and natural respectively?

A. Nylon and creatine, polyethylene and haemoglobin.

B. Polyethylene and creatine, nylon and haemoglobin.

C. Haemoglobin and nylon, creatine and polyethylene.

D. Nylon and polyethylene, creatine and haemoglobin.

69. Lamp black is obtained from _____

A. coal oil.

B. vegetable oils.

C. fuel oils.

D. animal oil.

70. When steam is passed over white hot coke, the products are _____ and _____

A. carbon (II) oxide and hydrogen.

B. carbon (II) oxide and nitrogen.

C. carbon (IV) oxide and hydrogen.

D. carbon (IV) oxide and nitrogen.

71. Carbon occurs naturally in an impure form as _____

A. coal.

B. petroleum.

C. wood.

D. natural gases.

72. The heating of bituminous coal to very high temperatures in the absence of air forms _____

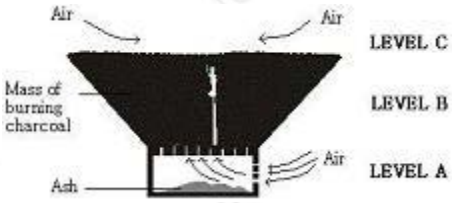
A. coal.

B. coke.

C. soot.

D. charcoal.

73. The diagram drawn shows the stages of combustion of charcoal, the equation of reaction of level C is _____



A. $CO + CO_2 \rightarrow 2CO_2$.

B. $2CO + O_2 \rightarrow 2CO_2$.

C. $CO_2 + C \rightarrow 2CO$.

D. $C + O_2 \rightarrow CO_2$.

74. Carbon black is obtained from the following options except _____

A. coal gas.

B. natural gas.

C. carbonaceous material.

D. fuel oils.

75. _____ occurs naturally as plumbago, an opaque black solid.

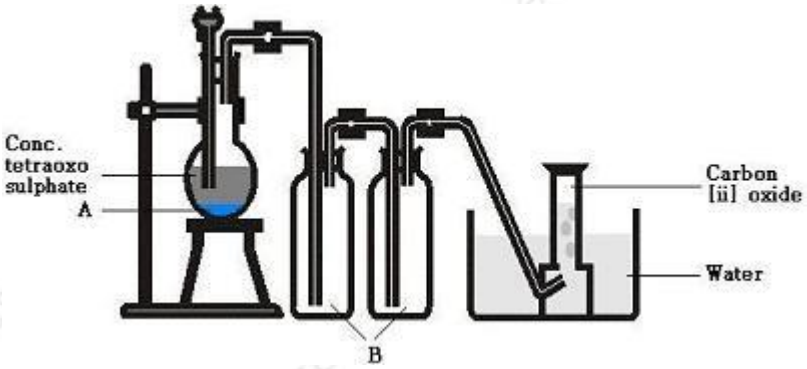
A. Lamp black

B. Animal charcoal

C. Artificial diamond

D. Graphite

76. The part labelled A and B in the diagram drawn is _____



A. Ethane and conc. NaOH.

B. $CaCO_3$ and conc. NaOH.

C. Ethane-dioic acid and dilute NaOH.

D. Ethane-dioic acid and conc. NaOH.

77. Which of the following is suitable for determining different isotopes present in an element which exhibits isotopy?

A. Sensitive weighing balance.

B. Cathode ray tube.

C. Mass spectrometer.

D. Geiger Muller counter.

78. Which of the following represents saponification?

A. Reaction of carboxylic acids with sodium hydroxide.

B. Reaction of alkanoates with acid.

C. Reaction of carboxylic acids with alcohols.

D. Reaction of alkanoates with sodium hydroxide .

79. **Consider the reaction below:**

Vegetable oil $\xrightarrow[\text{High temperature}]{\text{N, Ni catalyst}}$ **Product.**

This reaction is applied in the manufacture of _____

A. soapy detergent.

B. drugs.

C. paraffin wax.

D. margarine.

80. Which of the following is the odd one out?

A. Diamond.

B. Graphite.

C. Bronze.

D. Coal.

81. Gaseous components produced when coal is combusted include _____.

A. CO_2

B. SO_2

C. NO_x

D. all of the above

TOPIC: CHEMICAL EQUILIBRIUM

DIRECTION: Choose the correct answer from the lettered options.

1. **Explain the equation given below;**
$A + B \rightleftharpoons C \quad \triangle H = +ve$

A. The forward reaction is exothermic.

B. The backward reaction is endothermic.

C. The forward reaction is endothermic.

D. The backward reaction is in equilibrium.

2. **The effect of pressure on the reaction given below is _____**

$$H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$$

A. to encourage forward reaction.

B. to encourage backward reaction.

C. to remove the energy barrier.

D. pressure may not have any effect.

3 **In the reaction given,**

$$N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)} \quad \triangle H = +90.4$$

which option best explains the reaction?

A. Increasing the temperature of the system will shift the equilibrium position to the right, favouring the backward reaction.

B. Lowering the temperature of the system will shift the equilibrium position to the right, favouring the forward reaction.

C. Increasing the temperature of the system will shift the equilibrium position to the left, favouring the forward reaction.

D. Increasing the temperature of the system will shift the equilibrium position to the right, favouring the forward reaction.

4. The pH value of iron (III) chloride solution is likely to be _____

A. 3.

B. 7.

C. 9.

D. 11.

5. **In the reaction;**

$$SO_{2(g)} + O_{2(g)} \overset{V_2O_5}{\rightleftharpoons} SO_{3(g)}$$

The use of double arrows shows _____.

A. the reaction is in physical equilibrium.

B. contact process.

C. the reaction involves both forward and backward reactions.

D. the reaction is the rate determining step.

6. In which of the following cases will a decrease in pressure and an increase in temperature shift the equilibrium position to the right?

A. $X_{2(g)} + Y_{2(g)} \rightleftharpoons Z_{2(g)}$ H is -ve

B. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 2Z_{2(g)}$ H is -ve

C. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 3Z_{2(g)}$ H is +ve

D. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 3Z_{2(g)}$ H is -ve

7 **The equilibrium constant K, of this reaction is _____.**

$$_xZ + _bQ \rightleftharpoons _tM + _nR$$

A. $K = \frac{[Z]^x[Q]^b}{[M]^t[R]^n}$

B. $K = \frac{[M]^t [R]^n}{[Z]^x [Q]^b}$

C. $K = \frac{[Q]^b [M]^t}{[Z]^x [R]^n}$

D. $K = \frac{[t]^M [n]^R}{[x]^Z [Q]^b}$

8. In a reaction given,

$3Fe_{(s)} + 4H_2O_{(g)} \rightleftharpoons Fe_3O_{4(s)} + 4H_{2(g)}$

an increase in the concentration will cause _____

A. increase in the forward reaction.

B. decrease in the backward reaction.

C. increase in the backward reaction.

D. decrease in the forward reaction.

9. In which of the following reactions is Le' Chatelier's principle applied?

A. Endothermic.

B. Exothermic.

C. Redox.

D. Reversible.

10. Write down the expression for the equilibrium constant for given reaction,

$CO_{(g)} + 2H_{2(g)} \rightleftharpoons CH_3OH_{(g)}$

where K_c and K_p is used depending on whether it is easier to measure concentrations pressures

A. $K_p = \frac{[H_2]^2}{[CO][CH_3OH]}$

B. $K_c = \frac{[CO]}{[H_2]^2[CH_3OH]}$

C. $K_p = \frac{[CO][H_2]^2}{[CH_3OH]}$

D. $K_p = \frac{[CO][H_2]^2}{[CH_3OH]}$

11. Calculate the pH of a 0.001 m acid solution.

A. 5.

B. 3.

C. 4.

D. 2.

12. Catalysts are important in the chemical industry because _____

A. they affect the purity of the products.

B. they affect the quantity of the products.

C. they increase the time for reacting equilibrium.

D. bond breaking is slowed down.

13. A solution which resists changes in pH when a small amount of an acid or a base is added to it is known as a/an _____ solution.

A. acidic

B. basic

C. buffer

D. neutral

14. What is the name of the scientist who defined acid as 'a proton donor while base is a proton acceptor'?

A. Lewis.

B. Le-Chatelier

C. Arrhenius.

D. Bronsted-Lowry.

15. The following are factors affecting equilibrium reactions with the exception of _____

A. pressure (for solid systems).

B. concentration.

C. temperature.

D. pressure (for gaseous systems).

16. A reversible reaction is _____

A. a dynamic equilibrium when the forward reaction is occurring at a rate which produces no net change in the concentrations of the reactants or products in an open system.

B. a dynamic equilibrium when the backward reaction is occurring at a rate which produces a net change in the concentrations of the reactants or products in a closed system.

C. a static equilibrium when both the forward and backward reactions are occurring at the same rate, thereby producing no net change in the concentrations of the reactants or products in a closed system.

D. a dynamic equilibrium when both the forward and backward reactions are occurring at the same rate, thereby producing no net change in the concentrations of the reactants or products in a closed system.

17. $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

at 298K, $K_p = 834$, what will be the temperature at an equilibrium constant $K_p = 194$ given the enthalpy change for the reaction as $-1181.61\ J\ mol^{-1}$.
[Take $R = 8.314\ J\ K^{-1}mol^{-1}$]

A. -144.8 K.

B. 144.8 K.

C. 73.44 K.

D. -73.44 K.

18. A molecular orbital can accommodate only _____

A. one electron.

B. two electron.

C. four electron.

D. eight electron.

19. **Given the following equilibrium mixture of gases at $500^{o}C$ where ΔH is negative,**

$$2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)}$$

What will be the effect of cooling below $100^{o}C$?

A. forward reaction is favoured.

B. there is no change in the reaction.

C. backward reaction is favoured.

D. none of the above.

20. A solution which resists changes in pH on dilution or addition of small amounts of acids or alkalis is known as _____

A. buffer.

B. acid-base titrations.

C. pH scale.

D. Arrhenius theory.

21. A dynamic equilibrium whereby there is a balance change in the constituent substances in a reaction is called _____

A. physical equilibrium.

B. reversible equlibrium.

C. chemical equilibrium.

D. none of the above.

22. **The following equilibrium is established in a closed vessel.**

$A_{(g)} + B_{(g)} \rightleftharpoons 3C_{(g)} + D_{(g)}$ **ΔH is negative**

Which would increase the yield of C?

A. Increasing the temperature.

B. Decreasing the pressure on the reacting mixture.

C. Adding a positive catalyst.

D. Removing some D.

23. When temperature increases in an endothermic reaction, the equilibrium constant _____

A. decreases.

B. is the same.

C. increases.

D. none of the above.

24. Which of the following are conditions upon which an irreversible reaction is dependent?

[i] The temperature of the reacting system.

[ii] The pressure of the reacting system (for gases).

[iii] The concentration of the reacting system.

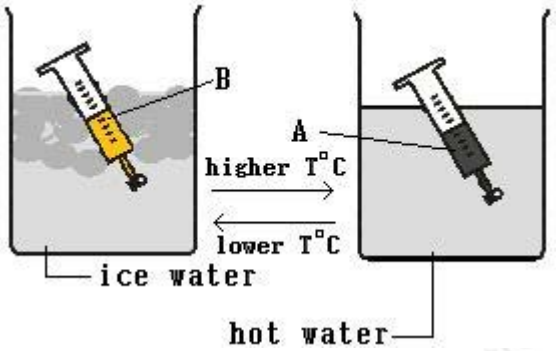
A. [ii] and [iii].

B. [iii] only.

C. [i], [ii] and [iii].

D. [i] and [iii].

25. From the diagram drawn, the part labelled A is _____



A. pale yellow [more N_2O_4].

B. brown [more NO2].

C. pale yellow [less N_2O_4].

D. brown [less NO2].

26. **Given the following equilibrium mixture of gases at 500°C where ΔH is negative,**

$$2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)}$$

What will be the effect of adding a catalyst?

A. backward reaction is favoured.

B. there is no change in the reaction.

C. forward reaction is favoured.

D. all of the above.

27. A solution of potassium chloride is _____

A. unionized.

B. neutral.

C. alkaline.

D. acidic.

28. Which of the following best expresses the mathematical relationship between standard electrode potential and equilibrium constant?

A. $E^{\theta} = {}^{RT\ ln\ K}/_{nF}$.

B. $E^{\theta} =.{}^{RTF}/_{n\ x\ ln\ K}$.

C. $E^{\theta} = {}^{Rn\ x\ ln\ K}/_{TF}$.

D. $E^{\theta} = {}^{FT\ ln\ K}/_{nR}$.

29. $N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$

In the endothermic reaction above, more product will be formed by _____

A. a constant volume.

B. a decrease in pressure.

C. a decrease in temperature.

D. a decrease in volume.

30. When temperature increases in an exothermic reaction, the equilibrium constant _____

A. decreases.

B. increases.

C. is the same.

D. all of the above.

31. A reaction that proceeds in both directions under suitable conditions is called a _____

A. reversible reaction.

B. chemical reaction.

C. physical reaction.

D. irreversible reaction.

32. The law of 'mass action' as postulated by Guldberg and Waage, states that _____

A. at constant pressure, the rate of reaction is proportional to the active masses of each of the reaction.

B. at constant temperature, the rate of reaction is proportional to the active masses of each of the reaction.

C. at constant temperature, the rate of reaction is inversely proportional to the active masses of each of the reaction.

D. at constant pressure, the rate of reaction is inversely proportional to the active masses of each of the reaction.

33. **In the decomposition of**

$$CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + 2CO_{2(g)}$$

The reaction will attain dynamic equilibrium only when _____

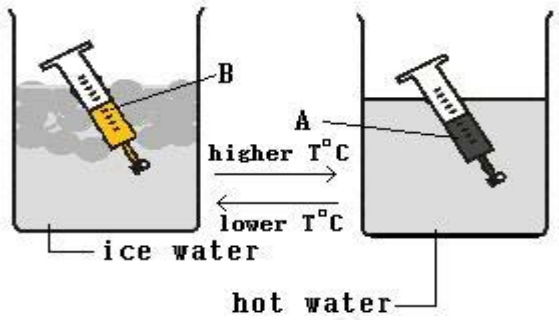
A. the reaction is in open system.

B. the reaction is heated strongly.

C. the reaction is in a closed system.

D. the reaction is catalysed.

34. From the diagram drawn, the part labelled B is _____



A. brown [more NO2].

B. pale yellow [less N2O4].

C. pale yellow [more N2O4].

D. brown [less NO2].

35. Which of the following reactions has no suitable indicator?

A. $Ca(OH)_{2(aq)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + H_2O_{(l)}$.

B. $NaOH_{(aq)} + CH_3COOH_{(aq)} \rightarrow CH_3COONa_{(aq)} + H_2O_{(l)}$.

C. $NaOH_{(aq)} + HCl_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)}$.

D. $NH_{(4)}OH_{(aq)} + CH_3COOH \rightarrow CH_3COONH_{4(aq)} + H_2O_{(l)}$.

36. Calculate the hydroxide ion concentration of a solution whose pH is 2.4.

A. $2.5 \times 10^{-2.}$

B. $2.5 \times 10^{-21.}$

C. $2.5 \times 10^{-12.}$

D. 2.5×10^{-10}.

37. **In the reaction given,**

$$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)} \quad \triangle H = -90.4$$

which of the following correctly favours the forward reaction?
[i] Increase pressure
[ii] Increase temperature
[iii] Decrease temperature

A. [i] and [iii].

B. [i] and [ii].

C. [ii] and [iii]

D. [iii] only.

38. The mathematical equation for calculating the equilibrium constant is given as _____

A. $\ln K = {}^{\Delta H\theta}/_{R} \times [{}^{1}/_{T}]$.

B. $\ln K = {}^{\Delta H\theta}/_{T} \times [{}^{1}/_{R}]$.

C. $\ln \Delta H^{\theta} = {}^{K}/_{R} \times [{}^{1}/_{T}]$.

D. $\ln K = {}^{R}/_{\Delta H^{\theta}} \times [{}^{1}/_{T}]$.

39. Le' Chatelier's principle states that _____

A. if an external constraint such as a change in temperature, pressure or concentration, is imposed on a chemical system in equilibrium, the equilibrium will shift so as to annul or neutralize the constraint.

B. If an internal constraint such as a change in heat content, enthalpy change, is imposed on a chemical system in equilibrium, the equilibrium will shift so as to annul or neutralize the constraint.

C. if an external constraint such as a change in pressure, volume, is imposed on a physical system in equilibrium, the equilibrium will shift so as to annul or neutralize the constraint.

D. If an internal constraint such as a change heat content, enthalpy change, is imposed on a physical system in equilibrium, the equilibrium will shift so as to annul or neutralize the constraint.

40. **For the reaction given below;**

The equilibrium constant has the value 10^{-16} atm^{-1} at 298K. The value of $\Delta H\theta$ is +131.3KJ mol^{-1}, calculate the value of the equillibrium constant at 1000 K?

[Take R = 8.314 JK^{-1} mol^{-1}]

A. 10-16 atm-1.

B. 1.04 x 10-16 atm-1.

C. 1.40 x 10-16 atm-1.

D. 1.44 atm-1.

41. Which of the following options is a condition for considering pressure in an equilibrium system?

A. There must be concentration gradient between the reactants and the products.

B. The reactants could be gases while the products may be solids.

C. Both products and reactants must be gaseous.

D. The reaction takes place in a closed system.

42. In which of the following cases will an increase in pressure and a decrease in temperature shift the equilibrium position to the right?

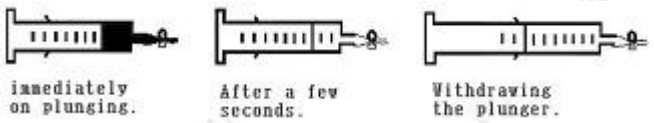
A. $X_{2(g)} + Y_{2(g)} \rightleftharpoons Z_{2(g)}$ H is -ve

B. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 3Z_{2(g)}$ H is +ve

C. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 2Z_{2(g)}$ H is +ve

D. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 3Z_{2(g)}$ H is -ve

43. The diagram drawn is an illustration to study _____



A. the effect of high pressure on the$N_2O_4 \rightleftharpoons 2NO$

B. the effect of temperature on the. $N_2O_4 \rightleftharpoons 2NO_2$.

C. the effect of concentration on the $N_2O_4 \rightleftharpoons 2NO_2$.

D. the effect of catalyst on the. $N_2O_4 \rightleftharpoons 2NO_2$.

44. From $E^{\theta} = \frac{RT \ln K}{nF}$, where E^{θ} is the standard electrode potential of a reaction, increasing the value of K will _____

A. increase the forward reaction.

B. increase the backward reaction.

C. decrease the forward reaction.

D. decrease the backward reaction.

45. Which of the following is a factor that affects equilibrium constant?

(i) Temperature.

(ii) Pressure.

(iii) Concentration.

(iv) Catalyst

A. (i) and (ii) only.

B. (i) only.

C. (i), (ii), (iii) and (iv).

D. (ii) and (iii) only.

46. Two boys steadily balanced in a sea-saw game is an example of _____

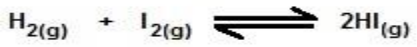
A. static equilibrium.

B. dynamic equilibrium.

C. homogeneous equilibrium.

D. mutual equilibrium.

47. **For the reaction given below;**



at 298K, K_p = 794, and at 500K, K_p = 160. Is the enthalpy change for the reaction endothermic or exothermic, calculate the value of $\Delta H\theta$? [Take R = 8.314 JK $^{-1}$ mol $^{-1}$]

A. -1181.61 J mol-1.

B. -1181.16 J mol-1.

C. -1811.61 J mol-1.

D. -1118.61 J mol-1.

48. **Consider the equilibrium reaction represented by the following equation:**

$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$; $\Delta H = 395.7\ kJmol^{-1}$

Which of the following statements about the equilibrium system is correct?

A. Addition of catalyst changes the equilibrium position.

B. Decrease in pressure increases the yield of SO3.

C. Decrease in pressure increases the equilibrium concentration of O2.

D. Increase in temperature favours the forward reaction.

49. **Given the following equilibrium mixture of gases at $500^{o}C$ where ΔH is negative,**

$2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)}$

What will be the effect of increasing the temperature?

A. the forward reaction is favoured.

B. the reaction is in equilibrium.

C. the backward reaction is favoured.

D. all of the above.

50. **Given the following equilibrium mixture of gases at $500^{o}C$ where $\Delta H$is negative.**

$2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)}$

What will be the effect of adding more O_2 at constant pressure?

A. more CO_2 is produced.

B. less CO_2 is produced.

C. the same CO_2 is produced.

D. more CO is produced.

51. **What happens if the temperature of this system is decreased?**

$SO_{2(g)} + O_{2(g)} \rightleftharpoons SO_{3(g)}$

$E^{\theta} = \frac{RT\ In\ K}{nF}. \Delta H = xKJ\ mol^{-1}$

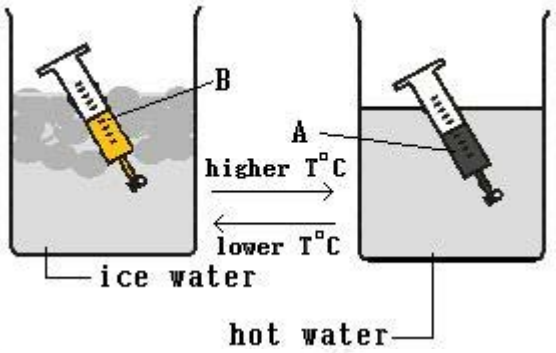
A. The reaction favours backward reaction.

B. The reaction attains equilibrium fast.

C. The reaction favours forward reaction.

D. The reaction favours both forward and backward reactions.

52. The diagram drawn is an illustration to study the _____



A. effect of pressure change on the equilibrium of dinitrogen (IV) oxide and nitrogen (IV) oxide.

B. effect of volume change on the equilibrium of dinitrogen (IV) oxide and nitrogen (IV) oxide.

C. effect of temperature change on the equilibrium of dinitrogen (IV) oxide and nitrogen (IV) oxide.

D. effect of concentration change on the equilibrium of dinitrogen (IV) oxide and nitrogen (IV) oxide.

53. In most equilibrium reactions, catalysts are not required because _____

A. catalyst reduces the energy barrier.

B. most catalyst are easily poisoned when wrongly chosen.

C. catalyst favours both forward and backward reactions.

D. catalyst could be positive or negative.

54. **In the reaction given below, what effect has conc. H_2SO_4 on the equilibrium?**

$$CH_3COOH + C_2H_5OH \overset{\text{conc. } H_2SO_4}{\rightleftharpoons} CH_3COOC_2H_5 + H_2O$$

A. To acidify the system.

B. To encourage backward reaction.

C. To encourage forward reaction.

D. To produce more CH3COOH.

55. Given the following equilibrium mixture of gases at 500oC where ΔH is negative,

2CO(g) + O2(g) ↔ 2CO2(g),

what will be the effect of doubling the pressure at 200oC?

A. There is no change in the reaction.

B. Backward reaction is favoured.

C. Forward reaction is favoured

D. None of the above.

TOPIC: ENERGY AND CHEMICAL REACTIONS

DIRECTION: Choose the correct answer from the lettered options.

1. The energy spent on disorganizing the regular structure of ions in a molecule is called _____

A. hydration energy.

B. lattice energy.

C. ionization energy.

D. electron affinity.

2. The second law of thermodynamics states that _____

A. a spontaneous process occurs only if there is a decrease in the entropy of a system and its surroundings.

B. a spontaneous process occurs only if the entropy of a system and its surroundings is zero.

C. a spontaneous process occurs only if there is an increase in the entropy of a system and its surroundings.

D. a spontaneous process occurs only if there is an increase in the enthalpy of a system and its surroundings.

3. The heat of reaction does not depend on _____

A. mass of reactants.

B. temperature and pressure.

C. physical state of the substance involved.

D. the quantity of heat.

4. Which word would you associate with the phrase 'reaction that gives out heat'?

A. Endothermic.

B. Reactive.

C. Fuel.

D. Exothermic.

5. To calculate the enthalpy or energy change for a reaction the following are recorded except _____

A. temperature change.

B. pressure change.

C. mass of reactants.

D. specific heat capacity of the reaction mixture.

6. A measure of the degree of disorderliness in a chemical system is known as the _____

A. activation energy.

B. enthalpy.

C. entropy.

D. energy of dissolution.

7. The change in internal energy ΔU of an endothermic system is mathematically expressed as _____

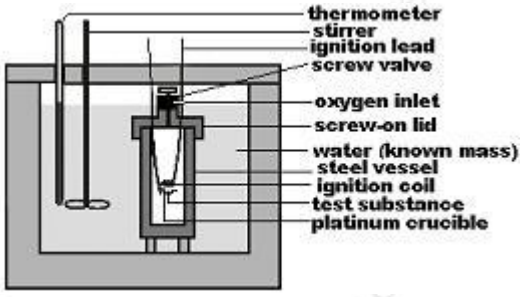
A. $\Delta U = \Delta H + p\Delta V$.

B. $\Delta U = \Delta H - q\Delta V$.

C. $\Delta U = \Delta H - p\Delta V$.

D. $\Delta U = \Delta H - q\Delta V$.

8. The diagram drawn is used to determine _____



A. heat of neutralization.

B. heat of combustion.

C. heat of solution.

D. heat of formation.

9. Which of these processes is endothermic?

A. Slaking of quicklime.

B. Formation of ammonia.

C. Combustion of graphite.

D. Dissolution of potassium trioxonitrate [v] in water.

10. $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}, \Delta H = 180.6KJ\ mol^{-1}$

In the reaction above, increase in temperature will _____

A. increase the quantity of N2.

B. increase the yield of NO.

C. decrease the yield of NO.

D. decrease the quantity of O2.

11. What is the heat of neutralization or heat energy when 100cm3 of 0.5M hydrochloric acid reacts with 100cm3 of 0.5M sodium trioxocarbonate, the temperature of reaction mixture and the total mass of reaction mixture is assumed to be 3.4K and 200g?

[Hint: Assume that specific heat capacity of reaction mixture = specific heat capacity of pure water = 4.2J g-1 K-1]

A. 57.1KJ.

B. 75.1KJ.

C. 141.24KJ.

D. 114.24KJ.

12. The determination of heat of combustion is carried out with _____

A. a thermometer.

B. a bomb calorimeter.

C. an evapourating dish.

D. a boiling tube.

13. The dehydration of ethanol gives ethene, calculate the approximate heat of reaction given the bond energies.

[C-C = 347KJ/mol, C-H = 414KJ/mol, H-O = 464KJ/mol, C-O = 360KJ/mol, C=C = 611KJ/mol

A. -974KJ.

B. -146KJ.

C. 974KJ.

D. 146KJ.

14. Calculate the approximate heat of reaction of the following reaction with its bond energy values

[bond energy of C-C = 347 KJ mol-1, C-H = 414KJ mol-1, O-O = 498KJ mol-1, C=O = 736KJ mol-1, O-H = 464KJ mol-1].

The equation of reaction is $C_3H_6(g) + 9/2O_2(g) \rightarrow 3CO_2(g) + 3H_2O(g)$.

A. +1,990KJ.

B. -2,337KJ.

C. -1,990KJ.

D. -2,140KJ.

15. The energy given out when the free ions are hydrated by water molecules is _____

A. crystal energy.

B. hydration energy.

C. activation energy.

D. lattice energy.

16. $NH_{3(g)} + HCl_{(g)} \rightarrow NH_4Cl_{(s)}$ ΔH

The entropy change in the system above is _____.

A. negative.

B. indeterminate.

C. positive.

D. zero.

17. Heat content of matter is sometimes called _____

A. entropy.

B. joule.

C. enthalpy.

D. energy

18. _____ is the heat absorbed in decomposing a compound equal to the heat evolved in its formation under the same conditions .

A. Conservation of heat.

B. Conservation of mass.

C. Conservation of energy.

D. Conservation of matter.

19. The amount of heat needed to raise the temperature of one kilogram of water by 1oC is called _____

A. kilojoule.

B. kilocalorie.

C. kilowatt.

D. calorie.

20. What does ΔH represent in the equation below?

H2(g) + 1⁄2O2(g)

→ H2O(g) ΔH = -242 KJ mol-1

A. Activation energy.

B. Dissociation energy.

C. Heat of formation.

D. Heat of neutralization.

21. Which of the following options presents decrease in entropy?

A. Melting of ice.

B. Decomposition of calcium hydrogen trioxocarbonate [iv].

C. Addition of cold water to starch solutions.

D. Addition of hot water to starch solution.

22. The entropy and enthalpy of a system are a measure of the _____

A. degree of disorderliness and heat content respectively.

B. heat content and degree of disorderliness respectively.

C. heat content of a system only.

D. degree of disorderliness only.

23. Reactive substances have _____

A. equal energy bonds.

B. no energy bonds.

C. low energy bonds.

D. high energy bonds.

24. Stable substances have _____

A. low energy bonds.

B. high energy bonds.

C. no energy bonds.

D. equal energy bonds.

25. The internal energy, U, of a chemical system is equal to the sum of _____

A. chemical energy and bond energy.

B. hydration energy and bond energy.

C. hydration energy and lattice energy.

D. lattice energy and bond energy.

26. Which word would you associate with the phrase 'a substance that releases energy on burning'?

A. Endothermic.

B. Reactive.

C. Fuel.

D. Exothermic.

27. The free energy of a chemical system is expressed as _____

A. -ΔStotal.

B. +TΔStotal.

C. -TΔStotal.

D. ΔStotal.

28. Which of the following statements are correct of DH, the enthalpy of reaction?

(I) The heat change accompanying a chemical reaction.

(II) Negative for an exothermic reaction.

(III) Positive for endothermic reaction.

(IV) All of the above.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

29. The term used when the total heat content of the products is less than that of the reactants is _____

A. exothermic.

B. endothermic.

C. thermothermic.

D. absorption energy.

30. Find the ΔH of a chemical system when the entropy is 218.2J K-1 mol-1 and the temperature is 100oC.

A. 81,388.6J q-1.

B. 40,694.3J q-1.

C. 122,082.9J q-1.

D. 132,082.9J q-1.

31. Energy Changes in chemical reactions are due to _____

A. the catalyst used in the reaction.

B. the type of bond.

C. heat.

D. the forming and breaking of bonds.

32. The amount of heat evolved or absorbed when a substance is formed is known as _____

A. heat of combustion.

B. heat of formation.

C. standard heat of solution.

D. heat of solution.

33. From the 1st law of thermodynamics ΔU = q + w. How is this equation given for gaseous system?

A. ΔU = q + wv.

B. ΔU = zero.

C. ΔU = q + Pv.

D. ΔU = q + PΔv.

34. Calculate q when a system does 72J of work and its internal energy decreases by 90J.

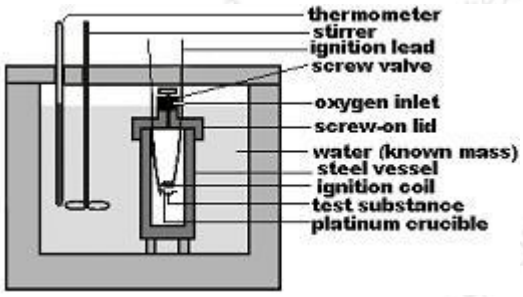
A. +18J.

B. -162J.

C. +162J.

D. -18J.

35. The diagram drawn is a device called _____



A. calorimeter.

B. combustion calorimeter.

C. bomb calorimeter.

D. iron calorimeter.

36. Heat content difference between the products and reactants of a chemical reaction is called _____

A. entropy change.

B. endothermic reaction.

C. exothermic reaction.

D. enthalpy change.

37. Entropy is defined as _____

A. a measure of the degree of order or stability of a substance at high temperature.

B. a measure of the degree of perfect order of a substance at low temperature.

C. the degree of disorder or randomness of a substance at low temperature.

D. a measure of the degree of disorder or randomness of a substance at high temperature.

38. In a chemical reaction the energy observed in the form of _____

[i] heat.

[ii] light and heat.

[iii] sound and heat.

A. [i]&[ii] only.

B. [ii] only.

C. [i], [ii]&[iii].

D. [iii] only.

39. A _____ is not a definition of an endothermic reaction.

A. reaction in which heat is absorbed.

B. reaction in which heat is released.

C. reaction in which ΔH = positive

D. reaction in which the energy of the product is higher than energy of the reactant.

40. The following options determine the spontaneity of a chemical system except _____

A. enthalpy change.

B. chemical equilibrium.

C. entropy.

D. free energy.

41. The amount of heat absorbed or evolved when one mole of a substance is dissolved in so much water that further dilution results in detectable heat change is known as _____

A. standard heat of solution.

B. heat of dilution.

C. heat of formation.

D. standard heat of dilution.

42. The amount of heat evolved when one mole of a substance is burned completely in oxygen is known as _____

A. heat of solution.

B. standard heat of solution.

C. heat of formation.

D. heat of combustion.

43. The following are precautions taken when measuring heat of combustion of a specimen except _____

A. the use of well lagged calorimeter.

B. use of volumes of water but continuously stirred.

C. both water and the bomb must attain steady temperatures before igniting the bomb.

D. tempeartures of the ignited bomb is taken every 30 second interval until a steady temperature is attained.

44. When the bond breaking energy, is greater than bond forming energy it is called _____

A. heat of reaction.

B. exothermic reaction.

C. endothermic reaction.

D. all of the above.

45. Which of the following decreases in a system when vapour condenses to a liquid?

A. Activation energy.

B. Enthalpy.

C. Entropy.

D. Number of molecules..

46. Which of the following is true of an endothermic reaction?

A. Enthalpy change is negative.

B. Heat energy is absorbed.

C. A catalyst is required.

D. Activation energy is high.

47. From the equation of reaction given below;

it can be inferred that _____

$2H_2O_{(l)} \rightarrow 2H_{2(g)} + O_{2(g)}$ $\Delta H = 285.58KJ/mol$

A. 285.58 kilojoules of energy was absorbed from the surroundings.

B. 285.58 kilojoules of energy was released into the surroundings.

C. 285.58 is the entropy energy change of the reaction.

D. none of the above.

48. For a given chemical reaction, the overall heat change of dissolution is endothermic if the _____

A. lattice energy is equal to the hydration energy.

B. lattice energy and hydration energy zero.

C. lattice energy is less than the hydration energy.

D. lattice energy is greater than the hydration energy.

49. When a molecule is homonuclear with higher bond energy it is _____

A. less difficult to break.

B. does not break.

C. more difficult to break.

D. needs low-energy to break.

50. Find ΔS for the conversion of one mole of liquid water at 150oC, given that the heat of vaporization of water is 2260.87KJ Kg-1.

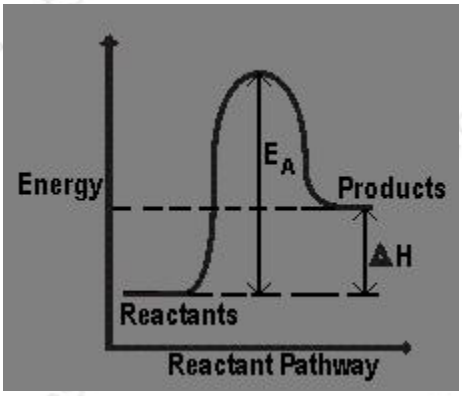
A. 96.20J/K/mol.

B. 182.50J/K/mol.

C. 271.30J/K/mol.

D. 149.10J/K/mol.

51. The diagram drawn illustrates the energy profile for _____



A. exothermic reaction.

B. endothermic reaction.

C. heat of formation.

D. heat of reaction.

52. The change in internal energy ΔU of an exothermic system is mathematically expressed as _____

A. ΔU = ΔH + pΔV.

B. ΔU = ΔH - pΔV.

C. ΔU = -ΔH + pΔV.

D. ΔU = -ΔH - pΔV.

53. An endothermic reaction is _____

A. one during which heat is liberated to the surroundings.

B. one during which energy is not required to form chemical bonds.

C. one during which energy is required to form chemical bonds.

D. one during which heat is absorbed from the surroundings.

54. [A]: $OH^-(aq) + H^+(aq) \rightarrow H_2O(l)$

[B]: $2OH^-(aq) + 2H^+(aq) \rightarrow 2H_2O(l)$;

From reactions A and B above, if the ΔH of A = -57.3KJ/mol. Then the ΔH of B is _____

A. -57.3/2KJ/mol.

B. -57.3 x 2KJ/mol.

C. (-57.3)2KJ/mol.

D. 2(-57.3)2KJ/mol.

55. An exothermic reaction is _____

A. one during which heat is liberated to the surroundings.

B. one during which heat is absorbed from the surroundings.

C. one during which energy is not required to break chemical bonds.

D. one during which energy is required to break chemical bonds.

56. In a chemical reaction, the reacting elements possess energy of motion known as _____

A. potential energy.

B. free energy.

C. bond energy.

D. kinetic energy.

57. What is the arrangement of the following salts in the order of their sensitivity to light?

A. AgI > AgCl > AgBr.

B. AgCl > AgI > AgBr.

C. AgBr > AgCl > AgI.

D. AgCl > AgBr > AgI.

58. The average amount of energy associated with making or breaking 1 mole of a particular bond in its gaseous state is called _____

A. dissociation energy.

B. bond energy.

C. reaction energy.

D. none of the above.

59. Calculate Δs in JK-1mol-1 for the conversion of one mole of liquid water to vapour at 100oC, given that the heat of vaporisation of water = 2260.87Jg-1.

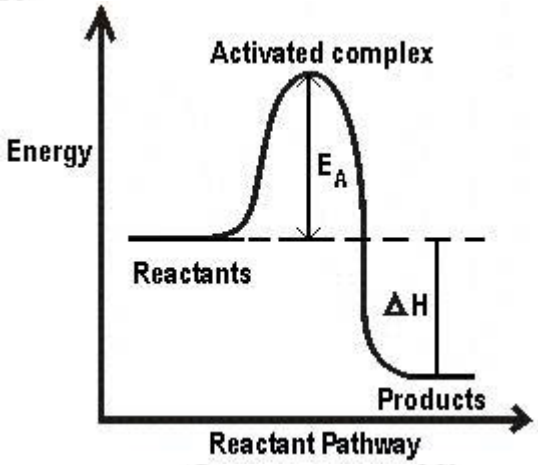
A. 99.7.

B. 100.7.

C. 109.1.

D. 110.0.

60. The diagram drawn illustrates the energy profile for _____



A. exothermic reaction.

B. endothermic reaction.

C. heat of combustion.

D. heat of reaction.

61. If ΔG (free energy) is used to determine spontaneity of a chemical reaction, what is the nature of the reaction of ΔG = zero?

A. The reaction is static.

B. The reaction is exothermic.

C. The reaction is endothermic.

D. The reaction is at equilibrium.

62. Substances which dissolve endothermically would dissolve more at _____

A. lower temperature.

B. any temperature provided not below freezing point.

C. higher temperature.

D. any isolated temperature.

63. A solute with a positive heat of solution has _____

A. great solubility.

B. no solubility.

C. less solubility.

D. solubility to be equilibrium with solvent.

64. The heat evolved when a substance is dissolved in water is known as the _____

A. heat of formation.

B. heat of combustion.

C. heat of solution.

D. standard heat of solution.

65. Which of the following is a condition for a spontaneous reaction?

A. ΔH - T is zero.

B. ΔH - TΔS is positive.

C. ΔH - T

ΔS is negative.

D. ΔS is zero.

66 The heat of formation of one mole of ionic crystal compound from widely separated gaseous ions under standard conditions is known as _____

A. bond energy.

B. crystal energy.

C. hydration energy.

D. lattice energy.

67. The amount of heat evolved or observed when a chemical reaction occurs between molar quantities of the substances as represented in the equation of reaction is known as _____

A. heat of reaction.

B. standard heat of reaction.

C. heat content.

D. All of the above.

68. The amount of heat absorbed or evolved when a concentrated solution is diluted is called _____

A. heat of solution.

B. heat of dilution.

C. heat of combustion.

D. heat of formation.

69. The notation ΔHfɵ represents _____

A. enthalpy change of formation.

B. heat change of formation.

C. standard heat change of formation.

D. standard enthalpy of formation.

70. The heat accompanying the reaction represented by the equation H2O(l) → H2O(g) is described as the heat of _____

A. solution.

B. neutralization.

C. vapourization.

D. sublimation.

71. The energy needed to split up crystals by water molecules into free ions is known as _____

A. activation energy.

B. crystal energy.

C. hydration energy.

D. lattice energy.

72. The thermodynamics law that states that energy may be converted from one form to another but it cannot be created or destroyed is known as the _____

A. First law.

B. Fourth law.

C. Third law.

D. Second law.

73. The energy barrier that must be overcome before a reaction can occur is called _____

A. chemical energy.

B. activation power.

C. activation energy.

D. heat energy.

74. Hess's law of constant heat summation states that _____

A. the total enthalpy change of a chemical reaction is different regardless of the route by which the chemical change occurs, provided that the conditions at the start of a reaction are diferent as the final condition.

B. the route by which a chemical change occurs gives a constant total enthalpy change, provided the initial and final conditions are different.

C. the route by which a chemical change occurs gives a constant total enthalpy change, provided the initial and final conditions of the chemical reactions are the same.

D. the route by which a chemical change occurs gives a constant total enthalpy change, provided there are no initial and final conditions of the chemical reactions.

75. From the equation given below:

$\Delta G = \Delta H - T\Delta S$,

this will make ΔG negative except _____

A. decreasing the temperature.

B. decreasing the enthalpy change.

C. increasing the temperature.

D. making ΔH and $T\Delta S$ equal.

76. Welding converts _____

A. electric energy to heat energy.

B. electric energy to light energy.

C. electric energy to both heat and light energies.

D. chemical energy to heat energy.

77. If the change in free energy (ΔG) of a reaction is positive, it can be deduced that the reaction will

(I) not proceed in the direction indicated.

(II) not be spontaneous.

(III) not occur at room temperature.

(IV) be feasible.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

TOPIC: GENERAL CHEMISTRY

DIRECTION: Choose the correct answer from the lettered options.

1. The products of electrolysis of dilute sodium chloride solution with platinum electrodes are _____ and _____

A. hydrogen, oxygen.

B. oxygen, chlorine.

C. chlorine, water.

D. sodium amalgam, chlorine.

2. A concentrated solution containing H+, Cu2+, OH− and Cl− was electrolyzed using platinum electrodes. Which of the ions will be discharged at the cathode?

A. H-.

B. Cu2+.

C. OH-.

D. Cl-.

3. Which of the following fractions of crude oil is likely to contain the hydrocarbon C12H26?

A. Kerosene.

B. Naptha.

C. Gas oil.

D. Fuel oil.

4. Which of the following features of a human skeleton can be determined by carbon-dating?

A. Height.

B. Mass.

C. Age.

D. Race.

5. If 10 cm3 of distilled water is added to 10 cm3 of an aqueous salt solution, the concentration of the solution _____

A. increases.

B. decreases.

C. remains constant.

D. doubles.

6. An increase in the pressure of a gas results in a decrease in it's _____

A. mass.

B. vapour density.

C. volume.

D. temperature.

7. Which of the following polymers contains nitrogen?

A. Nylon.

B. Polyvinyl chloride.

C. Polyethene.

D. Cellulose.

8. In linear molecules, the bond angle is _____

A. 90°.

B. 104°.

C. 120°.

D. 180°.

9. Given that the electronic configuration of an element X is$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$, it can be deduced that X _____

A. belongs to group 0 in the periodic table.

B. belongs to period 4 in the periodic table.

C. contains 3 unpaired electrons in the ground state.

D. has 6 electrons in its outermost shell.

10. Which of the following statements is correct about the reaction represented in the equation below?

$A_2(g) + B_2(g) \rightarrow 2AB(g)$; DH = + x kJmol-1.

A. The forward reaction is exothermic.

B. The reaction goes to completion at equilibrium.

C. Pressure has no effect on the equilibrium mixture.

D. At equilibrium, increase in temperature favours the reverse reaction.

11. Which of the following ions will migrate to the cathode during electrolysis?

A. Zinc ions.

B. Chloride ions.

C. Sulphide ions.

D. Tetraoxosulphate (VI) ions.

12. What would be the formula of the compound if the element Al reacts with an atom of an element X which has six electrons in its outermost shell?

[Al = 13]

A. AlX_2.

B. Al_2X.

C. Al_2X_2.

D. Al_2X_3.

13. Elements which belong to the same group in the periodic table are characterized by the _____

A. difference of +1 in the oxidation numbers of successive members.

B. presence of the same number of outermost electrons in the respective atoms.

C. difference of 14 atomic mass units between successive members.

D. presence of the same number of electron shells in the respective atoms.

14. P, Q, R and S are metals in the same group in the periodic table in periods 3, 4, 5 and 6 respectively. Which of them loses electrons least readily?

A. P.

B. Q.

C. R.

D. S.

15. The shapes of CO_2, H_2O and CH_4 respectively are_____, _____ and _____

A. bent, linear and tetrahedral.

B. bent, tetrahedral and linear.

C. linear, bent and tetrahedral.

D. tetrahedral, linear and bent.

16. The position of equilibrium in a reversible reaction is affected by _____

A. particle size of the reactants.

B. change in concentration of the reactants.

C. change in size of the reaction vessel.

D. vigorous stirring of the reaction mixture.

17. Hydrogenation of butene yields _____

A. butyne.

B. butane.

C. pentene.

D. butanol .

18. If X reacts with excess acidified $K_2Cr_2O_7$ to produce an alkanoic acid, X is _____

A. an alkanol.

B. an alkene.

C. an amino acid.

D. an alkanone.

19. A mixture of calcium chloride and calcium trioxocarbonate (IV) in water can be separated by _____

A. evaporation.

B. sublimation.

C. distillation.

D. filtration.

20. What is the oxidation number of Z in K_3ZCl_6?

A. -3.

B. +3.

C. -6.

D. +6.

21. Which of the following establishments uses the process of fermentation in it's operations?

A. Fertilizer plant.

B. Textile industry.

C. Brewery.

D. Soap manufacturing industry.

22. Given that the order of reactivity of four metals is P > Q > R > S, which of the following reactions is feasible?

A. S + P+→ P + S+.

B. Q + S+ → S + Q+.

C. R + P+ → P + R+.

D. S + Q+ → Q + S+ .

23. What is the most probable group of an element, which is a soft silvery white solid and reacts violently with water?

A. Group 0.

B. Group 1.

C. Group 4.

D. Group 6.

24. Which of the following compounds is readily soluble in water?

A. CuO.

B. AgCl.

C. Na2SO4.

D. CaCO3.

25. If the atomic number of an element X is 11 and that of nitrogen is 7, the most likely formula of the nitride of X is _____

A. X3N.

B. XN3.

C. X3N2.

D. N2X.

26. Ethene undergoes mainly addition reactions because it is _____

A. a gas.

B. a hydrocarbon.

C. unsaturated.

D. easily polymerized.

27. Which of the following without effervescence, would dissolve in warm dilute H_2SO_4 to give a blue solution?

A. Copper turnings.

B. Copper (II) trioxocarbonate (IV).

C. Copper (II) oxide.

D. Copper alloy.

28. Benzene produces more sooth than ethene on burning because benzene _____

A. has a higher molar mass.

B. has a higher degree of unsaturation.

C. undergoes both substitution and addition reactions.

D. is a liquid at room temperature.

29. In which of the reactions presented by the following equations is HNO3 behaving as a typical acid?

A. $CaO + 2HNO_3 \rightarrow Ca(NO_3)_2 + H_2O$.

B. $Cu + 4HNO_3 \rightarrow Cu(NO_3)_2 + 2H_2O + 2NO_2$.

C. $S + 6HNO_3 \rightarrow H_2SO_4 + 6NO_2 + 2H_2O$.

D. $P + 5HNO_3 \rightarrow H_3PO_4 + 5NO_2 + H_2O$.

30. Allotropes of an element differ in their _____

A. physical properties.

B. chemical properties.

C. mass numbers.

D. electronic configuration.

31. Hydrogen is used in oxy-hydrogen flames for melting metals because it _____

A. evolves a lot of heat when burnt.

B. combines explosively with oxygen.

C. is a very light gas.

D. is a rocket fuel.

32. What does ΔH represent in the equation given below?

Cl(g) + e- → Cl-(g); DH = - 363 kJmol-1?

A. Ionization energy.

B. Electron affinity.

C. Dissociation energy.

D. Heat of atomization.

33. Which of the following constitutes an advantage in the use of hard water?

A. Formation of scum with soap.

B. Furring of kettles.

C. Blockage of water pipes.

D. Formation of strong bones.

34. Potassium vapour burns with a _____

A. blue flame.

B. brick-red flame.

C. violet flame.

D. golden-yellow flame.

35. What is oxidized in the reaction represented by the following equation

$3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$

A. Oxygen.

B. Hydrogen.

C. Nitrogen.

D. Copper.

36. What is the oxidation number of nitrogen in Al(NO3)3?

A. +1.

B. +3.

C. +5.

D. +6.

37. A sheet of paper is placed in the path of a beam from a radioactive source. The emissions that pass through the paper consist of _____

A. alpha particles and gamma rays.

B. alpha and beta particles.

C. beta particles and gamma rays.

D. alpha particles only.

38. What quantity of electrons (in mole) is lost when one mole of iron (II) ions is oxidized to iron?

A. 4 mole.

B. 3 mole.

C. 2 mole.

D. 1 mole.

39. A common characteristic shared by iron and aluminium is that both _____

A. are extracted by reduction method.

B. form only basic oxides.

C. show oxidation states of +2 and +3.

D. form soluble hydroxides.

40. A sodium atom and a sodium ion have the same _____

A. number of neutrons.

B. number of electrons.

C. electric charge.

D. electronic structure.

41. Which of the following pairs of reagents react to produce hydrogen?

A. Zinc and concentrated trioxonitrate (V) acid.

B. Water and calcium dicarbide.

C. Copper and dilute hydrochloric acid.

D. Magnesium and dilute tetraoxosulphate (VI) acid.

42. Sugars can be hydrolysed at room temperature by the action of _____

A. mineral acids.

B. strong bases.

C. enzymes.

D. oxidants.

43. What can be deduced from the equation given below?

Ag+(aq) + Cl-(aq) → Ag+Cl-(s); DH = - 65.7 kJmol-1.

A. Direct combination is involved and the reaction is endothermic.

B. A solid is formed and heat is evolved.

C. Activation energy is high and a catalyst is required.

D. The reaction is endothermic and occurs at high temperature.

44. **What is the function of H_2SO_4 in the following reaction?**

$$C_{12}H_{22}O_{11} \xrightarrow{\text{conc. } H_2SO_4} 12C + 11H_2O$$

A. Oxidizing agent.

B. Strong acid.

C. Dehydrating agent.

D. Catalyst.

45. Which of the following compounds is covalent?

A. $CaCl_2$.

B. MgO.

C. NaH.

D. CH_4.

46. What is the value of X in the following equation?

$MnO_4^- + 4H^+ + Xe^- \rightarrow MnO_2 + 2H_2O$

A. 2.

B. 3.

C. 4.

D. 7.

47. The metal that liberates hydrogen from cold water in bubbles only is _____.

A. Ca

B. Na

C. Al

D. K

48. A gas that is not associated with global warming is _____.

A. CO_2

B. SO_3

C. CH_4

D. H_2

49. Which of the following reactions represents the change that occurs when a photographic film is exposed to sunlight?

A. $Ag \rightarrow Ag^+ + e^-$.

B. $Ag^+ + e^- \rightarrow Ag$.

C. $2Ag + Br2 \rightarrow 2AgBr$.

D. $Ag^+ + Br^- \rightarrow AgBr$.

50. If the value of ΔH for a reaction is negative, it means that the reaction is _____

A. slow.

B. exothermic.

C. spontaneous.

D. irreversible.

51. In the electrolysis of $CuSO_4(aq)$ using copper electrodes, the reaction at the anodes is _____

A. discharge of SO_4^{2-} .

B. discharge of OH^-.

C. dissolution of copper electrode.

D. evolution of energy.

52. Which of the following is a physical change?

A. Exposing white phosphorus to air.

B. Dissolving calcium in water.

C. Freezing ice-cream.

D. Burning kerosine.

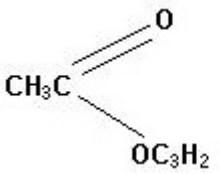
53. The presence of unpaired electrons in an atom of a transition metal gives rise to _____

A. para magnetism.

B. malleability.

C. ductility.

D. shiny appearance.

54.  is a/an _____.

A. tertiary alkanol.

B. alkanone.

C. alkanoic acid.

D. alkanoate.

55. Which of the following substances decomposes when an electric current is passed through it?

A. Glucose solution.

B. Zinc rod.

C. Hydrochloric acid.

D. Tetrachloromethane.

56. One of the products of combustion of pentane in excess air is _____

A. pentanol.

B. pentene.

C. nitrogen (II) oxide.

D. carbon (IV) oxide.

57. The most important use of hydrogen is in the _____

A. hydrogenation of oils.

B. manufacture of methyl alcohol.

C. manufacture of ammonia.

D. manufacture of ethyl alcohol.

58. The main type of reaction that occurs in the blast furnace during the extraction of iron is _____

A. reduction reaction.

B. decomposition.

C. exothermic reaction.

D. combustion.

59. How many unpaired electrons are there in an atom of an element with the following electronic configuration,

1s22s22p6?

A. 0.

B. 1.

C. 2.

D. 6.

60. Which substance could be a fuel in the future?

A. Hydrogen.

B. Carbon.

C. Carbon monoxide.

D. Oxygen.

TOPIC: INTRODUCTION TO CHEMISTRY

DIRECTION: Choose the correct answer from the lettered options.

1. The difference between chemical law and chemical hypothesis is _____

A. chemical law is explicit while hypothesis is not.

B. chemical law is a statement made by a scientist while hypothesis is a reasonable explanation to an observation made.

C. chemical law is a statement which confirms the hypothesis after an experiment while hypothesis is a reasonable explanation to an observation.

D. chemical law is concise while hypothesis is not.

2. Chemical hypothesis is different from chemical law in that _____.

A. hypothesis is not reasonable while law is reasonable

B. hypothesis is a reasonable explanation to observations made while law is a statement from a scientist

C. hypothesis is a reasonable explanation to observations while law is a statement which confirms the hypothesis after extensive tests.

D. none of the above

3. The first step of the scientific method involves _____.

A. forming a hypothesis

B. making observations

C. performing an experiment

D. predicting the result of an experiment

4. Which of these is not a chemical change?

A. Rusting

B. Sublimation of solids

C. Saking of quicklime

D. Fermentation of glucose

5. The following except _____, are professions in chemistry.

A. philosophers

B. miners

C. geologists

D. engineers

6. From the options given below, pick the odd one out.

A. Cooking.

B. Oil and margarine.

C. Hair cream and perfume.

D. Soaps and detergent.

7. Separation of mixtures of solids with various sizes include _____.

A. magnetic separation

B. coarsing

C. sublimation

D. sieving

8. Which of these requires crystallization most?

A. Drug making

B. Cement making

C. Paint making

D. Perfume making

9. Which of the following option is the odd one out?

A. Air

B. Urine

C. Brass

D. Sand

10 _____ is established only after the theory has been extensively tested and proven true without any exception.

A. Scientific law

B. Theory

C. Hypothesis

D. Observation

11. A pattern or relationship that has been established based on a large amount of experimental data is a _____

A. theory.

B. hypothesis.

C. law.

D. decree

E. framework

12. Fractional crystallization is a method of separating _____.

A. crude oil

B. liquid - liquid mixture

C. coal

D. solids of different solubilities in a liquid

13. Chemistry can be defined as _____

A. a branch of knowledge which produces chemicals.

B. a branch of science which makes physics and biology clearer.

C. the oldest branch of science.

D. the branch of science which deals with changes in matter.

E. none of the above

14. Which of the following is most correct?

A. You can reject or accept a hypothesis, but never prove it to be true

B. You can prove a hypothesis to be true

C. You can prove a hypothesis to be false

D. Accepting or rejecting a hypothesis is the same as proving whether or not the hypothesis is true

15. In paper and gas chromatography respectively, the common feature between them is that they have _____.

A. solid phase and moving phase

B. stationary phase and moving phase

C. long phase and stationary phase

D. chromatic phase and stationary phase

16. A chemist is a _____.

A. scientist who is trained in the field of chemical changes of the environment

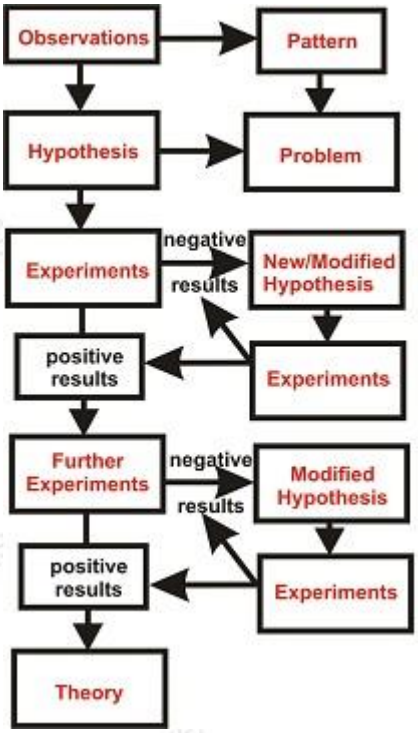
B. scientist who is trained in the field of polymerisation

C. scientist who is trained in the field of chemistry

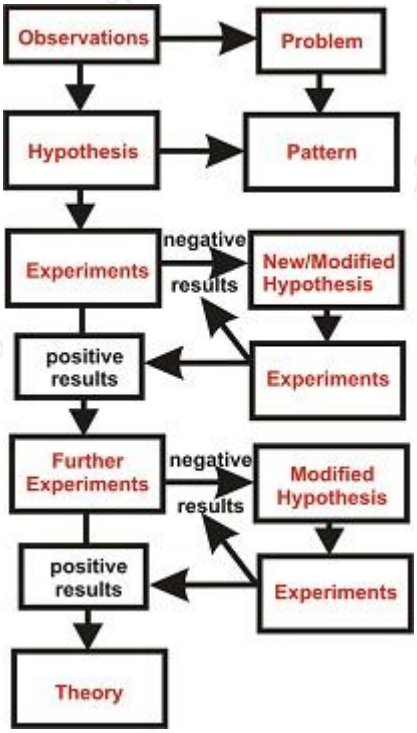
D. scientist who is trained in the field of chemical energy

17. Which of the following option best illustrates the scientific method?

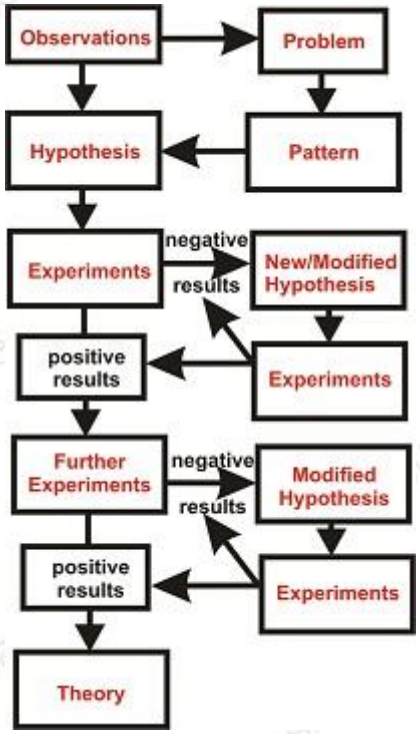
A.



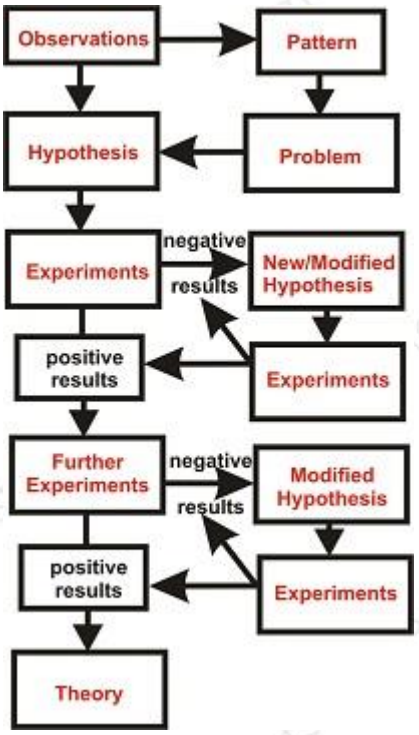
B.



C.



D.



18. If your hypothesis is rejected, which is true?

A. Your experiment may well have been a success! After all, you were probably testing the null hypothesis.

B. Your hypothesis is rejected, then your experiment was poorly designed.

C. The null hypothesis never works.

D. All of the above.

19. Scientific approach to discoveries follows the order, _____, _____ and _____

A. observation, hypothesis, and experiments.

B. experiments, hypothesis, and results.

C. results, experiment, and observation.

D. theory, results, and experiments.

20. The following are chemical changes except _____

A. rusting of iron.

B. fading of coloured clothes.

C. dilution of salt in water

D. decomposing of green leaves.

E. hydrogenation of vegetable oil

21. From the options given below, pick the odd one out.

A. Rusting

B. Burning firewood

C. Rotting leaves

D. Plastics

22. The method adopted in the separation of lead II chloride from water is _____.

A. sieving

B. decantation

C. crystallization

D. distillation

23. The way of studying a problem is known as _____.

A. experiments

B. scientific principle

C. scientific method

D. test

24. Which of these professions has no need for chemistry?

A. Miners

B. Engineers

C. Philosophers

D. Geologists

25. Separation of different carotenes from carrot root uses a method of _____.

A. chromatography

B. carotinization

C. distillation

D. centrifugation

26. Chemical changes around us include the following options with the exception of _____.

A. rusting of iron nails

B. fading of coloured cloth

C. sieving

D. decomposing of green leaves in a compost

27. If the result of an experiment turn out differently from what you expected, then _____

A. the experiment is a faliure.

B. you should explore the possible reason for this in the 'conclusions' section of your experimental write-up.

C. you need to re-do your experiment untill you get the expected result.

D. you didn't follow the scientific method.

28. _____ is a well-substantiated explanation of an aspect of the natural world.

A. A theory

B. A law

C. An hypothesis

D. An experiment

E. A research

29. All except one is not a popular criteria for purity;

A. melting point

B. boiling point

C. temperature

D. centrifugation

30. If you have a control for your experiment, which of the following is true?

A. There can be more than one difference between the control group and the test groups, but not several difference or else the experiment is invalid

B. Tthe control and the test groups may have several differences between them

C. The control group is identical to each test group except for one variable

D. The test group is always the same with the control group

TOPIC: KINETIC THEORY OF MATTER. GAS LAWS

DIRECTION: Choose the correct answer from the lettered options.

1. If 380cm3 of hydrogen diffuses in 19 seconds, how long will it take 560cm3 of a gas, Y, whose vapour density is 25 to diffuse under the same conditions?

[Relative molecular mass of hydrogen = 2g/mol]

A. 95 seconds.

B. 29.5 seconds.

C. 140 seconds.

D. 94.9 seconds.

2. The law which states that, 'If there is a mixture of gases which do not react chemically together, then the total pressure exerted by the mixture is the sum of the partial pressure of the individual gas that make up the mixture', is called _____

A. Boyle's law.

B. Dalton's law.

C. Graham's law.

D. Dalton's theory.

3. A given amount of gas was collected over water at 302K where the vapour pressure of water was 4.0KN m-2. Calculate the pressure of the dry gas if the atmospheric pressure at the same temperature was 101.3KN m-2.

A. 105.3KN $m^{-2.}$

B. 97.3KN $m^{-2.}$

C. 101.3KN $m^{-2.}$

D. 93.7KN $m^{-2.}$

4. If 10cm3 of hydrogen gas were sparked with 20cm3 of oxygen, calculate the volume[s] of residual gas[es] after cooling.

A. 25cm^3 of $O_{2.}$

B. 5cm^3 of O_2.

C. 15cm^3 of O_2.

D. 10cm^3 of O_2.

5. The closer the molecules of a gas are in the liquid state _____

A. the more accurately it will follow the ideal gas equation.

B. the more it will deviate from the ideal gas equation.

C. the more random is the movement of its molecules.

D. the greater is the pressure it exerts on the walls of the container.

6. Find the volume of 25.5g of ammonia, at s.t.p.

[Molar volume of a gas is 22.4dm^3, molar mass of NH_3 is 17g].

A. 3.36dm^3.

B. 33.6dm^3.

C. 14.9dm^3.

D. 1.49dm^3.

7. Gay-Lussac's law states that _____

A. at constant pressure the volume of gaseous reactants are in a simple ratio to one another and to the volume of the product if gaseous.

B. at constant temperature the volume of gaseous reactants are in a simple ratio to one another and to the volume of the product if gaseous.

C. at constant pressure and volume the volume of gaseous reactants are in a simple ratio to one another and to the volume of the product if gaseous.

D. at constant pressure and temperature the volume of gaseous reactants are in a simple ratio to one another and to the volume of the product if gaseous.

8. From the ideal gas equation, PV = nRT, the unit of n is _____

A. atm dm^3.

B. atm dm^3 K-1.

C. moles.

D. K^{-1} $mole^{-1.}$

9. A certain mass of hydrogen gas collected over water at 8oC and 785 mmHg pressure has a volume of 65 cm3, the volume when it is dry at s. t. p. is _____

[SVP of water at 8oC = 14mmHg]

A. 64.1cm^3.

B. 62.2cm^3.

C. 67.9cm^3.

D. 66.$^{0}cm^{3.}$

10. How many molecules of oxygen gas are contained in 0.2 mole of oxygen gas?

[O = 16]

A. 0.20 x 10^{23}molecules.

B. 1.204 x 10^{23}molecules.

C. 2.40 x 10^{23}molecules.

D. 1 molecule.

11. The mole fraction of oxygen in a gaseous mixture containing 2.5 moles of nitrogen, 1.5 moles of helium and 1 mole of oxygen is _____

A. 1/5.

B. 2/5.

C. 1/2.

D. 3/5.

12. Kelvin temperature can be converted into celsius temperature by _____

A. °C = K - 273.

B. °C = K + 273.

C. °C + 273/K.

D. K + 273/oC

13. When pollen grains are suspended in water and viewed under a microscope, they appear to be in a state of constant but erratic motion. This is due to _____

A. a chemical reaction between the pollen grains and water.

B. convection current.

C. small changes in pressure.

D. the bombardment of the pollen grains by molecules of water.

14. Given that r is rate and p is density, the expression r α 1/√p represents _____

A. Boyle's Law.

B. Charles' Law.

C. Dalton's Law.

D. Graham's Law.

15. The relationship between volume of a given mass of gas and pressure at constant temperature is called _____

A. Charles' law.

B. Gay-Lussac’s law.

C. Dalton's law.

D. Boyle's law.

16. Which of these does not support the phenomenon of kinetic theory?

A. Brownian motion.

B. Diffusion.

C. Osmosis.

D. Linear expansion.

17. Hydrogen sulphide is prepared at one end of a laboratory. It takes 5 seconds for a student at the other end to smell it. How long will it take to smell sulphur dioxide from the same position?

A. 5 seconds.

B. 2.5 seconds.

C. 3.6 seconds.

D. 6.9seconds.

18. The combination of butane in oxygen [air] is represented in the equation below;

$C_4H_{10}(g) + O_2(g) \rightarrow H_2O(g) + CO_2(g)$.

Calculate the volume of oxygen at s. t. p. needed to burn 30cm3 of the butane.

A. 4.62cm^3.

B. 195cm^3.

C. 291.2dm^3.

D. 0.383dm^3.

19. Water exists as a solid, liquid and gas respectively because _____

A. water is colourless.

B. water is electrovalent.

C. water in any state possesses a certain degree of motion in the molecules.

D. water is molecular.

20. What is the volume of oxygen required to completely burn 40cm3 of ammonia gas if the reaction took place at a constant temperature and atmospheric pressure?

[Hint: Equation of reaction $NH_3(g) + O_2(g) \rightarrow NO(g) + H_2O(g)$]

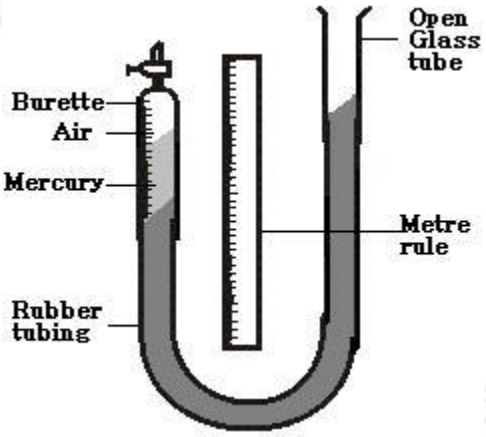
A. 32cm3.

B. 50cm3.

C. 5cm3.

D. 23cm3.

21. The diagram drawn is a simple apparatus used to illustrate _____



A. Charles' law.

B. Dalton's law.

C. Boyle's law.

D. Gay-Lussac’s law.

22. _____ is when more than the average kinetic energy of molecules escape.

A. Melting.

B. Freezing.

C. Evaporation.

D. Efflorescence.

23. br360cm3 of a gas has a pressure of 760mmHg. Find its volume if the pressure is reduced to 742mmHg.

A. 351.5cm3.

B. 1566.4cm3.

C. 368.7cm3.

D. 156.2cm3.

24. The vapour pressure of a liquid depends on _____

[i] the temperature

[ii] the nature of the liquid

[iii] the type of liquid

A. [i] and [iii] only.

B. [i] only.

C. [i] and [ii] only.

D. [i], [ii] and [iii]

25. Find the volume of hydrogen produced at s. t. p. when 25g of zinc are added to excess dilute hydrochloric acid at 31oC and 778mmHg pressure.

[H = 1, Zn = 65, Cl = 35.5, molar volume of a gas at s. t. p. = 22.4dm3]

A. 17.248dm3.

B. 7.93dm3.

C. 15.86dm3.

D. 18.76dm3.

26. When the number of particles condensing into liquid is equal to the number of particles evaporating from the liquid it is called _____

A. evaporation.

B. boiling.

C. saturated vapour pressure.

D. condensation.

27. The vapour density of a gas is defined as _____

A. the number of times a given volume of the gas (or vapour) is as heavy as the same volume of hydrogen at a particular temperature and pressure.

B. the number of times a given volume of the gas (or vapour) is as heavy as the same volume of hydrogen at a particular temperature.

C. the number of times a given volume of the gas (or vapour) is as heavy as the same volume of carbon at a particular temperature and pressure.

D. the number of times a given volume of the gas (or vapour) is as heavy as the same volume of hydrogen at a particular pressure.

28. The molar volume of any gas is equal to _____

A. 2.24dm^3.

B. 2240$cm^{3.}$

C. 224dm^3.

D. 22.4$dm^{3.}$

29. The pressure on 100cm3 of oxygen gas at 35oC is 750mmHg. What would be the volume of the gas in dm3 if the pressure is increased to 1000mmHg without changing the temperature?

A. 55.3dm3.

B. 65.5dm3.

C. 75.0dm3.

D. 87.5dm3.

30. At 20oC, a sample of hydrogen gas occupies 360cm3. What will the volume be at 80oC, if the pressure remains constant?

A. 287.3cm3.

B. 298.8cm3.

C. 433.7cm3.

D. 343.8cm3.

31. 400cm3 of a gas n diffused through a porous pot in 2 minutes. Calculate the rate at which n diffuses.

A. 6.3cm3 s-1.

B. 20cm3 s-1.

C. 200cm3 s-1.

D. 3.33cm3 s-1.

32. According to the kinetic molecular theory, molecules are in random motion. This motion is greatest when a substance is changing from _____

A. gas to liquid.

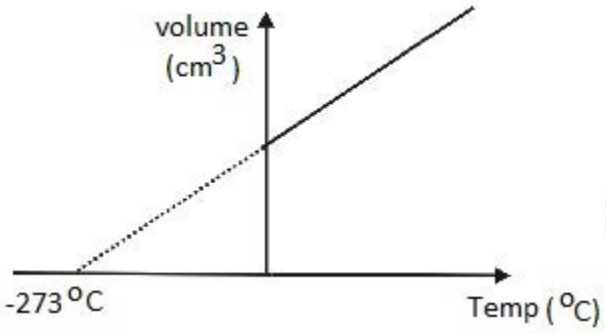
B. liquid to gas.

C. liquid to solid.

D. solid to gas.

Use the graph to answer the question.

33. The graph illustrates _____ law.



A. Boyle's

B. Charles'

C. Dalton's

D. Gay-Lussac's

34. Under the same conditions of temperature and pressure, oxygen diffuses twice as fast as a gas, Y, the relative molecular mass of Y is ____

[Relative molar mass of oxygen = 32]

A. 128.

B. 64.

C. 32.

D. 256.

35. If 465cm3 of sulphur[iv]oxide can diffuse through a porous partition in 30 seconds, how long will it take oxygen to diffuse through the same partition?

[S = 32, O = 16]

A. 21.2 seconds.

B. 60 seconds.

C. 30 seconds.

D. 15 seconds.

36 The general gas equation is mathematically expressed as _____

A. PV/nT.

B. PVT.

C. PV/T.

D. PT/V.

37. When pollen grains are suspended in water and viewed through a microscope, they appear to be in a state of constant but erratic motion. This is due to _____

A. convection currents.

B. small changes in pressure.

C. small changes in temperature.

D. the bombardment of the pollen grains by molecules of water.

38. The value of a standard pressure and temperature of a gas is _____ and _____

A. 760cmHg and 273oC.

B. 760mmHg and 273K.

C. 0.76cmHg and 273oC.

D. 760cmHg and 273K.

39. The presence of sodium chloride in ice will _____

A. decrease or lower the boiling point of sodium chloride.

B. increase the melting point of sodium chloride.

C. make sodium chloride impure.

D. lower the freezing point of sodium chloride.

40. Find the volume of oxygen at s.t.p. required to produce 2.5cm3 of steam.

A. 8.96cm3.

B. 5cm3.

C. 1.25cm3.

D. 2cm3.

41. To what temperature in kelvin must a gas be raised from 273K in order to double both its volume and pressure?

A. 298.

B. 300.

C. 546.

D. 819.

42. Ice is less dense than water because it _____

A. cannot take the shape of the container.

B. has a lower temperature.

C. has an open crystalline lattice.

D. has rigid molecules that oscillate about a fixed.

43. Equal volumes of all gases at the same temperature and pressure contain the same number of molecules is known as _____

A. Avogadro's law.

B. Archimedes theory

C. Avogadro's hypothesis.

D. None of the above.

44. The relationship between volume of a given mass of gas and temperature at constant pressure is _____

A. Boyle's law.

B. Gay-Lussac’s law.

C. Charles' law.

D. Dalton's law.

45. What will be the new volume [V] if the new pressure is halved and the initial pressure remain the same _____

A. $2P_1V_1 = P_2V_2$.

B. $P_1V_1 = 2P_2V_2$.

C. $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$.

D. $P_1V_1 = \frac{P_2V_2}{T_2}$.

46. If the rate of diffusion of oxygen gas is 1, what will be the rate of diffusion of methane whose relative molar mass is 16?

A. 0.5.

B. 1.2.

C. 1.4.

D. 1.8.

47. The force that the gaseous particles exert per unit area of the wall is known as _____

A. atmospheric pressure.

B. liquid pressure.

C. gas pressure.

D. all of the above.

48. What volume of steam would be produced if two volumes of oxygen were exploded with four volumes of hydrogen?

A. 2.

B. 3.

C. 4.

D. 5.

49. _____ increases as the vapour pressure increases.

A. Condensation

B. Evaporation

C. Melting

D. Boiling

50. The pressure exerted by a gas is as a result of _____

A. the continuous random motion of its particles.

B. bombardment of the walls of the container by its molecules.

C. the expansion of the gas molecules.

D. the elastic nature of the gas molecules.

51. The movement of water molecules through a semi-permeable membrane from a region of high concentration to a region of low concentration is called _____

A. diffusion.

B. Brownian movement.

C. transportation.

D. osmosis.

52. The law which states that at a constant temperature and pressure, the rate of diffusion of a gas is inversely proportional to the square root of its relative molecular mass is called _____

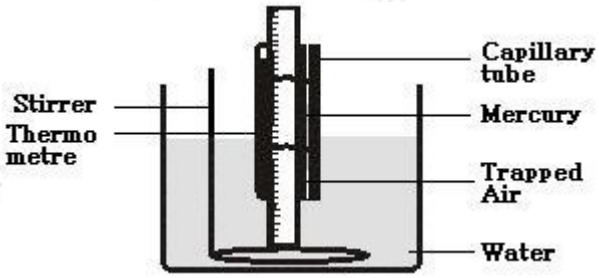
A. Gay-Lussac’s law.

B. Boyle's law.

C. Avogadro's hypothesis.

D. Graham's law.

53. The diagram drawn is a simple apparatus used to illustrate _____



A. Boyle's law.

B. Gay-lussac's law.

C. Dalton's law.

D. Charles' law.

54. By experiment, 2 volumes of ammonia decompose to give 1 volume of nitrogen and 3 volumes of hydrogen. Applying a chemical law this becomes: 2 molecules of ammonia decompose into 1 molecule of nitrogen and 3 molecules of hydrogen. The law applied is _____

A. Boyle's law.

B. Charles' law.

C. Gay-Lussac's law.

D. Avogadro's law.

55. Convert -132oC to kelvin temperature.

A. -405K.

B. 141K.

C. 405K.

D. -141K.

56. The volume of any gas occupied by one mole of that gas at s.t.p. is called _____

A. gas volume.

B. mole volume.

C. ideal gas volume.

D. molar volume.

57. The ideal gas equation is mathematically expressed as _____

A. PV/T.

B. PV/nT.

C. PVT.

D. PT/nV.

58. Boyle's law is explained as follows.

A. If the volume of a given mass of gas is reduced at constant temperature, the molecules move faster and so cause greater pressure.

B. If the volume of a given mass of a gas is reduced at constant temperature, the molecules strike the walls of their container more often and so cause greater pressure.

C. If pressure of a fixed mass of gas is increased, the molecules move more slowly and so cause greater pressure.

D. If the pressure of a fixed mass of gas is increased, the temperature rises and so the molecules strike the walls of their container more often.

59. A given volume of oxygen diffused through a porous partition in 8 seconds. How long would it take the same volume of carbon (IV) oxide to diffuse under the same condition?

[C = 12.0, O = 16.0]

A. 5.8 seconds.

B. 6.8 seconds.

C. 9.4 seconds.

D. 11.0 seconds.

60. Which of the three states of matter has no fixed shape, no fixed volume and least dense?

A. Gas.

B. Liquid.

C. Solid.

D. Crystals.

61. At s. t. p. a certain mass of gas occupies a volume of 780cm3. Find the temperature at which the gas occupies 1008cm3 and has a pressure of 710mmHg.

A. 377.6K.

B. 329.6K.

C. 226.1K.

D. 197.4K.

62. 30cm3 of sulphur [IV] oxide are sparked with 25cm3 of oxygen. If all the volume of gases are measured at s. t. p., the volume of the residual gases after sparking is _____

[Hint: Equation of the reaction SO3(g) + O2(g) → SO4(g)]

A. 30cm3.

B. 45cm3.

C. 40cm3.

D. 55cm3.

63. _____ occurs when the saturated vapour pressure of a liquid equals the atmospheric pressure.

A. Evaporation

B. Melting

C. Boiling

D. Condensation

64. 298 cm3 of a gas collected over water at 2oC and 780mm of Hg, what will be the volume at S.T.P. when the water vapour pressure is 20 mm of Hg?

A. 273 cm3.

B. 293 cm3.

C. 296 cm3.

D. 278 cm3.

65. Which of the following theory does not describe the behaviour of an ideal or perfect gas?

[i] The gas molecules move randomly in straight lines

[ii] The collision of the gas molecules are perfectly inelastic

[iii] The cohesive forces between the gas molecules are negligible

[iv] The temperature of the gas is a measure of the average kinetic energy of the gas particles.

A. [i] only.

B. [ii] only.

C. [i] and [iii] only.

D. [iv] only.

66. Find the volume of 2.5 moles of oxygen.

A. 5.6dm3.

B. 560dm3.

C. 56dm3.

D. 0.56dm3.

67. _____ increases with increase in temperature.

A. Boiling

B. Vapour pressure

C. Rate of evaporation

D. Latent heat of vaporization

68. How many atoms are contained in 2g of hydrogen gas?

[H = 1]

A. 6.02 x 1023atoms.

B. 6.02 x 1023molecules.

C. 12.04 x 1023atoms.

D. 12.04 x 1023molecules.

69. 272cm3 of carbon[iv]oxide were collected over water at 15oC and 782mmHg pressure. Calculate the volume of the dry gas at s. t. p.

[SVP of water at 15oC is 12mmHg]

A. 261.2cm3.

B. 254.5cm3.

C. 290.7cm3.

D. 283.2cm3.

70. If 465cm3 of sulphur[iv]oxide can diffuse through a porous partition in 30 seconds, how long will 620cm3 of hydrogen sulphide take to diffuse through the same partition?

[H = 1, S = 32, O = 16]

A. 54.9 seconds.

B. 16.4 seconds.

C. 30.9 seconds.

D. 29.1 seconds.

71. The diagram drawn represents one of the gas laws, which mathematical equation best explains the diagram?

A. P α V.

B. P α 1/V2.

C. P α V2.

D. P α 1/V.

72. P1V1 = P2V2 supports _____

A. Charles' law.

B. Boyle's law.

C. Graham's law.

D. Avogadro's law.

73. Convert 405K to celsius temperature.

A. -132°C.

B. 678°C.

C. 132°C.

D. -678°C.

74. An increase in temperature causes an increase in the pressure of a gas because _____

A. it increases the mass of the molecules.

B. it causes the molecules to combine together.

C. it decreases the average velocity of the molecules.

D. it increases the average velocity of the molecules.

TOPIC: PERIODIC TABLES. FAMILIES OF ELEMENTS

DIRECTION: Choose the correct answer from the lettered options.

1. Which of the following statements about the electronic configurations of two elements X and Z given below, is correct?

(i) X $1s^2 2s^2 2p5$

(ii) Z $1s^2 2s^2 2p^6 3s^2 3p^5$

A. X and Z both form anions readily.

B. X forms anions and Z forms cations only.

C. X forms cations and Z forms anions only.

D. X and Z both form cations readily.

2. Mendeleev periodic table was arranged in order of their _____

A. atomic numbers.

B. molecular shapes and orbitals.

C. increasing relative atomic mass.

D. orbital configuration.

3. The atomic numbers of the following elements T, X, Y, W and Z are 10, 11, 12, 14 and 15. Which element is an alkali and alkali-earth metal?

A. X and T.

B. W and Z.

C. X and Y.

D. T and Z.

4. Which of the following represents an inert gas configuration?

A. $1s^{2.}$

B. $1s^2 2s^2$.

C. $1s^2 2s^2 2p^1$.

D. $1s^2 2s^2 2p^2$.

5. The electronic configuration of an element is $1s^2\ 2s^2\ 2p^6\ 3s2\ 3p^3$. How many unpaired electrons are there in the element?

A. 5.

B. 4.

C. 3.

D. 2.

6. From the diagram drawn, the element that is a halogen is _____

1 A							
		5 E					10 J
11 K	12 L					17 Q	

A. J.

B. Q.

C. K.

D. A.

7. The following are periodic properties except _____

A. ionization potential.

B. electronegativity.

C. electron affinity

D. ionic affinity.

8. The following options are properties of elements which show periodicity except _____

A. ionization energies and electron affinity.

B. electropositivity.

C. melting and boiling point.

D. electrical and thermal conductivities.

9. Which one of the following statements is true of elements in the modern periodic table?

A. Elements with similar properties occur in horizontal rows.

B. The elements in group VIII of the table form monatomic ions with a charge of -1.

C. The elements are arranged in order of increasing atomic number.

D. The elements are arranged in order of increasing mass number

10. Which of these metals is a liquid at room temperature?

A. Beryllium

B. Lithium

C. Mercury

D. Osmium

11. An atom is said to be neutral when _____

A. the number of protons and neutrons are equal.

B. the number of electrons and neutrons are different.

C. the number of protons and electrons are greater than the number of neutrons.

D. the number of protons and electrons are equal.

12. G is in a group known as _____

I	II	III	IV	V	VI	VII	VIII
							Helium
Lithium							
A	B	C	D	E	F	G	H

A. alkali metals.

B. alkaline-earth metals.

C. rare gases.

D. Halogens.

13. The chemically unreactive group of elements is called the _____

A. alkali metals.

B. alkaline earth metals.

C. halogens.

D. noble gases.

14. Which element is an example of a noble gas?

A. Krypton.

B. Chlorine.

C. Iridium.

D. Nitrogen.

15. The atomic radius decreases with _____ in ionization energy.

A. a decrease

B. no change

C. an increase

D. a change

16. Bronze is an alloy of _____

A. silver and copper.

B. silver and gold.

C. copper and tin.

D. copper and zinc.

17. Which of the following decreases across the period?

A. Atomic size.

B. Electron Affinity.

C. Electronegativity.

D. Inert tendencies.

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

18. The element that can exit as atoms is _____

A. D.

B. E.

C. F.

D. H.

19. A gradual change of property within a group is known as _____

A. period trend.

B. triad.

C. group trend.

D. family.

Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

20. The compound formed between C and G will be _____

A. ionic and solid.

B. ionic but gaseous.

C. covalent but soild.

D. covalent but gaseous.

21. The electronic configuration, $1s^2 2s^2 2p^6 3s^2 3p^6$ is that of a _____

A. noble gas.

B. group ii element.

C. group iii element.

D. group v element.

22. Lithium, berylium, and boron have oxidation numbers 1, 2, and 3 respectively. Therefore the oxidation number of the hydrogen atom when it forms hydrides of these elements is _____

A. +1.

B. -1.

C. +2.

D. -2.

23. The ionization energy of an atom is affected by the following except _____

A. the size of the negative nuclear charge.

B. the distance of the outermost electron from the nucleus.

C. the screening effect of the inner electron.

D. the size of the positive nuclear charge.

24. In the periodic table, elements are arranged according to their _____

A. atomic masses.

B. mass numbers.

C. atomic numbers.

D. valence electrons.

25. All the electrons in a given shell possess approximately _____

A. equal energy.

B. different energy.

C. less energy to each other.

D. greater energy in the first shell.

26. _____ is the variation of the properties of elements in a regular pattern both down the groups and across the periods.

A. Periodic Table

B. Periodic law

C. Periodicity

D. Periodic function

27. Which element has the highest first ionization energy?

A. Sodium

B. Aluminium

C. Calcium

D. Phosphorus

28. The following affects the ionization energy of an atom except _____

A. distance of the outermost electron from the nucleus.

B. the size of the positive nuclear charge.

C. the screening effect of the inner electrons.

D. solvent medium.

29. A species has 20 neutrons, 17 protons and 18 electrons. Which of the following statements is correct?

A. It is a calcium ion, Ca^{2+} .

B. It is a chloride ion, Cl^-.

C. It is a neutral atom of argon, Ar.

D. It is a sulphide ion, S^{2-}.

30. Important properties of elements which show periodicity are _____

A. melting and boiling points.

B. electrical conductivities.

C. ionization energies and atomic size.

D. size of the positive nuclear charge.

31. The elements in group 1 are called _____

A. alkali non-metals.

B. alkali-earth metals.

C. alkali metals.

D. acids.

32. The electronic configuration of an element in its ground state is $1s^22s^22p^63s^23p^2$. Which of the following statements is correct?

A. An atom of the element has 2 valence electrons.

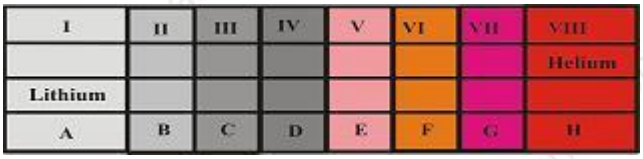
B. An atom of the element has 3 valence electrons.

C. The element is from Group 3 of the periodic table.

D. The element is in period 3 of the periodic table.

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

33. An element in the same group with the element that forms the largest number of compounds is _____



A. A.

B. C.

C. D.

D. F.

The diagram drawn is a periodic table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

34. The strongest oxidizing agent is _____

A. H.

B. G.

C. F.

D. E.

35. Which group of elements forms hydrides that are pyramidal in structure?

A. Group III.

B. Group IV.

C. Group V.

D. Group VI.

36. When a metal atom combines with a non-metal atom, the non-metal atom will _____

A. lose electrons and decrease in size.

B. lose electrons and increase in size.

C. gain electrons and decrease in size.

D. gain electrons and increase in size.

37. The attractive force exerted by the nucleus on the outermost electrons of the atom _____

A. decreases across a period.

B. increases down a group.

C. increases across a period.

D. decreases down a group.

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

38. The oxide formed by C is _____

I	II	III	IV	V	VI	VII	VIII
							Helium
Lithium							
A	B	C	D	E	F	G	H

A. acidic.

B. amphoteric.

C. neutral.

D. basic.

39. The sugar that is produced by plants during photosynthesis is _____

A. galactose.

B. fructose.

C. glucose.

D. sucrose.

40. _____ discovered the method of arrangement of elements according to their atomic mass.

A. Mendeleev

B. Dalton

C. Chadwick

D. Niels Bohr

41. Which of the following statements is true?

A. Chlorine commonly forms monoatomic ions with a +1 charge.

B. Helium can exist as a monoatomic gas.

C. Sodium exists as diatomic molecules

D. The elements are arranged in the modern periodic table in order of increasing mass number.

42. The following groups of elements except _____ show great similarity in their chemical properties

A. Group 1.

B. Group 7.

C. Group 0.

D. Group 5.

43. Which compound forms a coloured aqueous solution?

A. $CaCl_2$.

B. $CrCl_3$.

C. NaOH.

D. KBr.

44. Which of the following statements about the trends down group seven (lowest to highest atomic number) in the periodic table is correct?

A. The atomic size increases.

B. The non-metallic character increases.

C. The ionisation energy increases.

D. The number of electrons in the valence shell increases.

45. The atomic numbers of the following elements T, X, Y, W and Z are 10, 11, 12, 14 and 15. Which element has the same number of electron as a noble gas?

A. X.

B. Y.

C. W.

D. T.

46. Which three groups of the Periodic Table contain the most elements classified as metalloids (semi-metals)?

A. 1, 2, and 13.

B. 2, 13, and 14.

C. 14, 15, and 16.

D. 16, 17, and 18.

47. S-block elements of the periodic table are made up of _____

A. Groups 1, 2 and 3.

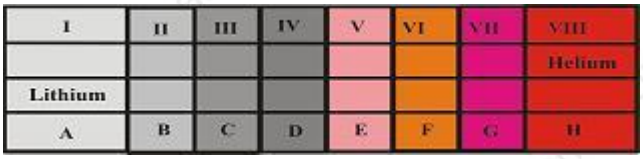
B. Groups 1 and 2.

C. Group 3.

D. Group 3 to 7.

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A – H represent elements whose symbols have not been used.

48. Lithium, Beryllium, Boron, Carbon, Nitrogen, Oxygen, Fluorine, and Neon are in the same period of the periodic table, therefore _____



A. they react alike.

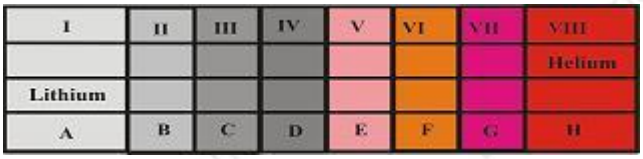
B. their oxides are basic.

C. their chlorides are soluble in water.

D. they behave differently.

Diagram drawn is a Periodic Table.In this table, Lithium and Helium have been put in their right place. The letters A – H represent elements whose symbols have not been used.

49. The compound formed between C and F has the formula _____



A. CF.

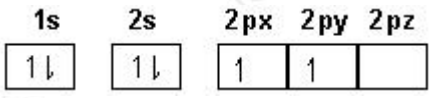
B. CF_2.

C. C_2F.

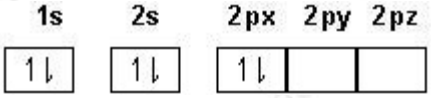
D. C_2F_3.

50. Which of the following represents the ground state electronic configuration of an element with atomic number of 6?

A.



B.



C.

1s	2s	2px	2py	2pz
1↓	1	1	1	1

D.

1s	2s	2px	2py	2pz
1	1	1↓	1	1

51. All of the following elements except _____are alkali metals.

A. sodium

B. rubidum

C. cesium

D. radium

52. What is the electronic configuration of an element represented as 199X?

A. $1s^2\ 2s^2\ 2p^5$.

B. $1s^2\ 2s^2\ 3s^2\ 3p^3$

C. $1s^2\ 2s^2\ 2p^3\ 3s^2$.

D. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$

53. Group 1A metals are not found free in nature because they _____

A. have low melting and boiling points.

B. have weak metallic bonding.

C. conduct electricity and heat.

D. are very reactive.

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

54. The strongest reducing agent is _____

I	II	III	IV	V	VI	VII	VIII
							Helium
Lithium							
A	B	C	D	E	F	G	H

A. C

B. B

C. A

D. G

55. Which halogens are gases at STP?

A. chlorine and fluorine.

B. chlorine and bromine.

C. iodine and fluorine.

D. iodine and bromine.

56. Atoms with the largest atomic radius are located _____

A. at the top of their group.

B. in the middle of their group.

C. at the bottom of their group.

D. you cannot predict atomic radius by location within a group.

57. Which of the following atoms in its ground state has the greatest number of valence electrons?

A. Al.

B. P.

C. S.

D. Si.

58. All these properties belong to the halogens except _____

A. they are all non-metals.

B. they exist as diatomic molecules.

C. they are coloured.

D. they do not ionize to form univalent negative ions.

59. An ion of a metal is _____

A. smaller than the atom from which it is formed.

B. larger than the atom from which it is formed.

C. equal to the atom from which it is formed.

D. all of the above.

60. Elements in the same group may be said to belong to _____

A. a family.

B. a group trend.

C. a triad.

D. a period trend.

61. The energy required to remove a valence electron from an atom of the element to form an ion is called _____

A. thermal energy.

B. electron affinity.

C. ionization energy.

D. electronegativity.

62. When the number of electrons increases, the electrons occupies the shell with _____

A. the lowest energy level.

B. the same energy level.

C. the highest energy level.

D. all of the above.

63. Elements in the same group of the periodic table have _____

A. similar electronic configuration.

B. similar orbital configuration.

C. the same number of valence electrons.

D. the same number of electrons.

64. Which element derives its symbol from the latin word, aurum, which means 'shining dawn'?

A. Aluminum.

B. Americium.

C. Gold.

D. Silver.

65. The following are S-block elements except _____

A. lithium.

B. magnesium.

C. potassium.

D. boron.

66. Which of the following elements has the lowest ionisation energy?

A. Chlorine.

B. Fluorine.

C. Magnesium.

D. Sodium.

67. The periodic law states that _____

A. the physical properties of the elements are a Periodic Table of their atomic numbers.

B. the physical and chemical properties of the elements are a Periodic Function of their atomic numbers.

C. the physical and chemical properties of the elements are a Periodic Table of their atomic numbers.

D. the physical and chemical properties of the elements are a Periodic Function of the relative atomic mass.

68. Which of the following is a property of transition elements?

[i] The elements are hard, dense metals with high melting and boiling points.

[ii] The elements often have several valencies.

[iii] Their compounds are often coloured.

[iv] The elements and their compounds often show catalytic properties.

A. [i] and [iii] only.

B. [i], [ii] and [iii].

C. [i], [ii], [iii] and [iv].

D. [ii], [iii] and [iv].

69. The energy change that occurs when a gaseous atom acquires an electron to form a univalent negative ion is called _____

A. electronegativity.

B. ionization energy.

C. electron affinity.

D. thermal energy.

70. The energy change which accompanies the addition of an electron to a gaseous atom is _____

A. atomization.

B. electron affinity.

C. electronegativity.

D. ionisation.

71. Which of the following does not represent a valid set of quantum numbers for an orbital?

A. n = 4

l = 2

ml = -2.

B. n = 4

l = 4

ml = -3.

C. n = 4

l = O

ml = O.

D. n = 4

l = 1

ml = 1.

72. Which of the following portion of the electromagnetic spectrum has the longest wavelength?

A. x-rays.

B. visible spectrum.

C. microwaves.

D. radio waves

73. The electron configuration of carbon atom in its excited state is _____

[6C]

A. $1s^2\ 2s^2\ 2p_x^1\ 2p_y^1$.

B. $1s^2\ 2s^2\ 2p_x^2\ 2p_y^\circ$.

C. $1s^1\ 2s^2\ 2p_x^1\ 2p_y^1\ 2p_z^1$.

D. $1s^2\ 2s^1\ 2p_x^1\ 2p_y^1\ 2p_z^1$

74. The ionic radii of non-metal are _____

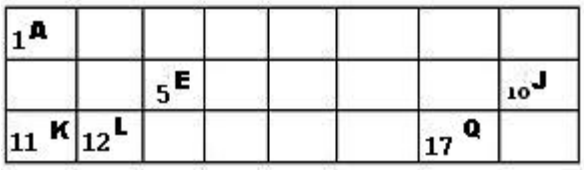
A. smaller than the atomic radii.

B. equal to the atomic radii.

C. greater than the atomic radii.

D. none of the above.

75. From the diagram drawn, the electronic configuration of element L in group 2 is ____



A. $1s^2 2s^2 2p^6 3s^2$.

B. $1s^2 2s^2 2p^6 3s^2 3p^2$.

C. $1s^2 2s^2 2p^6 3s^2$.

D. $1s^1 2s^2 2p^6 3s^2$.

76. The periodic table is divided into _____

A. Eight periods and seven groups.

B. Seven groups and six periods.

C. Eight groups and eight periods.

D. Eight groups and seven periods.

77. What happens to the size of an atom down a group?

A. Increases as the atomic number decreases.

B. Increases as the atomic number increases.

C. Decreases as the atomic number increases.

D. Decreases as the atomic number decreases.

78. The groups are numbered from ____ to ____

A. 1, 8.

B. O, 8.

C. O, 7.

D. 1, 7.

79. Which of the following elements is diatomic?

A. Iron.

B. Neon.

C. Oxygen.

D. Sodium.

80. Which of the following is insoluble in water?

A. MgO.

B. P_4O_{10}.

C. K_2O.

D. N_2O3.

81. Special properties of the transition elements are as a result of _____

A. ability to produce coloured ions.

B. ability to have variable valencies.

C. ability to possess partially filled d orbitals.

D. inert octet electrons.

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

82. The element that forms a normal oxide in which the atomic ratio of the element and oxygen is 2:3 is _____

I	II	III	IV	V	VI	VII	VIII
							Helium
Lithium							
A	B	C	D	E	F	G	H

A. A.

B. B.

C. C.

D. D.

83. When combining with non-metallic atoms, metallic atoms generally will _____

A. lose electrons and form negative ions.

B. lose electrons and form positive ions.

C. gain electrons and form negative ions.

D. gain electrons and form positive ions.

84. The electronic configuration of 2422X ion is _____

A. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^2$.

B. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^1$

C. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$.

D. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$.

85. In the Periodic table, what property decreases along the period and increases down the group?

A. Atomic number.

B. Ionization potential.

C. Electron affinity.

D. Atomic radius.

86. The atomic numbers of the following elements T, X, Y, W and Z are 10, 11, 12, 14 and 15. What group and period is the element W found?

A. 2 and 4.

B. 4 and 3.

C. 6 and 2.

D. 4 and 2.

87. What happens to the size of an atom across a period?

A. Decreases as the atomic number decreases.

B. Increases as the atomic number decreases.

C. Increases as the atomic number increases.

D. Decreases as the atomic number increases.

88. Which of the following statements is true of elements in the modern periodic table?

A. The elements are arranged in order of increasing mass number.

B. Sodium is a diatomic element.

C. Chlorine commonly forms monoatomic ions with a +1 charge.

D. Helium can exist as a monoatomic molecule.

89. Which of the following elements is a d-block element?

A. Calcium.

B. Iron.

C. Lithium.

D. Silicon.

90. From the diagram drawn, the most reactive metallic and non-metallic elements are _____

1 A							
		5 E					10 J
11 K	12 L					17 Q	

A. A and Q.

B. L and Q.

C. A, K, and Q.

D. A, L and Q.

91. Which of the noble gases has the greatest ionization energy?

A. He.

B. Ar.

C. Xe.

D. Kr.

92. Which set of elements contains a metalloid?

A. K, Mn, As, Ar.

B. Li, Mg, Ca, Kr.

C. Ba, Ag, Sn, Xe.

D. Fr, F, O, Rn.

93. Which of the following electronic configurations represents an element that forms a monoatomic ion with a charge of -2?

A. $1s^2 2s^2$.

B. $1s^2 2s^2 2p^{2.}$

C. $1s^2 2s^2 2p^{4.}$

D. $1s^2 2s^2 2p^{6.}$

94. Which of the following does not affect ionisation energy?

A. Atomic radius.

B. Nuclear charge.

C. Number of atomic shells.

D. Number of electrons in the outermost shell.

95. The electronic configuration of 2 compounds x and y are as follows:

x= $1s^2 2s^2 2p^6 3s^1$
y = $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$.

Which of the statements below is true?

A. x belongs to group 1
y belongs to group 2.

B. x belongs to group 1
y belongs to group 8.

C. x belongs to group 2
y belongs to group 1.

D. x belongs to group 7
y belongs to group 2.

E. x belongs to group 3
y belongs to group 4.

96. The electronic configurations of two elements X and Z are as follows:

X $1s^2 2s^2 2p^6 3s^1$

Z $1s^2 2s^2 2p^6 3s^2 3p^1$

Which of the following statements about X is correct?

A. X and Z both form anions readily

B. X forms anions and Z forms cations only

C. X forms cations and Z forms anions only

D. X and Z both form cations readily

97. The correct electronic configuration of an element X with an atomic number 14 is _____

A. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$

B. $1s^2 2s^2 2p^6 3s^2 3p^2$.

C.. $1s^2 2s^2 2p^6 3s^2 3p^3$.

D.. $1s^2 2s^2 2p^6 3s^2 3p^4$.

98. From the diagram drawn, the element that is the alkaline earth metal is _____

1 A							
		5 E					10 J
11 K	12 L					17 Q	

A. A.

B. E.

C. L.

D. J.

99. What is the number of protons (p), neutrons (n) and electrons (e) in the element $^{96}_{42}Mo^{3+}$?

A. 42p

42n

39e.

B. 42p

96n

39e.

C. 42p

54n

39e.

D. 42p

54n

45e.

100. A given orbital is labelled with a quantum number ml = -2. Which of the following statements is correct?

A. The orbital could be within an s sub-level.

B. The orbital could be within a p or d sub-level.

C. The orbital could be within a d sub-level but not a p sub-level.

D. The orbital could be within an s or a p sub-level.

101. The metallic bonds of metals _____

A. increases in strength down a group.

B. decreases in strength across a period.

C. decreases in strength down a group.

D. increases in strength across a period.

102. Which of the following decreases from left to right across the period but increases down the group in the periodic table?

(I) Ionization energy.

(II) Electron affinity.

(III) Electronegativity.

(IV) Atomic radius.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

103. Groups 3 to 0 make up the _____

A. p-block.

B. s-block.

C. d-block.

D. f-block.

104. Ionization energy tends to _____

A. increase across a period and increase down a group.

B. decrease across a period and increase down a group.

C. decrease across a period and decrease down a group.

D. increase across a period and decrease down a group.

105. The periodic table is an arrangement of the elements in increasing order of their _____

A. atomic weights.

B. atomic numbers.

C. mass numbers.

D. neutron/proton ratios.

106. Calcium and magnesium belong to the same group in the periodic table because both _____

A. are metals.

B. form cations.

C. form colourless salts.

D. have the same number of valence electrons.

107. The element 'X' does not usually form compounds with atoms of other elements. Which one of the following could be the electronic configuration of 'X'?

A. $1s^2 2s^1$.

B. $1s^2 2s^2 2p^6$.

C. $1s^2 2s^2 2p^3$.

D. $1s^2 2s^2 2p^1$.

108. The periods are numbered from _____ to _____

A. 1, 7.

B. 1, 6.

C. 0, 6.

D. 0, 7.

109. Which of the following describes the trends across the third period of elements (lowest to highest atomic number) in the periodic table?

A. The metallic characteristics increase.

B. The atomic size increases.

C. The number of the outermost energy level increases.

D. The electronegativity increases.

110. Which one of the following is likely to be the formula of the most stable sulphide of aluminium (atomic number 13)?

A. AlS.

B. AlS_2 .

C. Al_2S_3.

D. Al_3S_2.

111. Which of the elements in the following option form the f-block according to the arrangement of electron in the orbital?

A. Transition and Actinides elements.

B. Lanthanides and Transition elements.

C. Actinides and Lanthanides elements.

D. Lanthanides and active elements.

112. _____ of a non-metal is larger than the atom from which it is formed.

A. An atom

B. An ion

C. A molecule

D. A proton

113. Which element in group 15 has the strongest metallic character?

A. Bi.

B. As.

C. P.

D. N.

114. Which of the following is true of elements in the periodic table?

A. All elements in the same group have atoms with the same number of main electronic shells

B. The atoms of the elements are arranged in order of increasing number of electrons

C. The last number of each period is a noble gas

D. All of the above

TOPIC: SEPARATION AND PURIFICATION OF CHEMICAL SUBSTANCES

DIRECTION: Choose the correct answer from the lettered options.

1. Water, ethanol, and diethyl ether have boiling points 100oC, 78oC, and 35oC respectively. The best method of separating them in a mixture is by _____

A. fractional crystallisation.

B. fractional distillation.

C. evaporation.

D. simple distillation.

2. Which of the following characteristics of liquids given below is correct?

[i] It assumes the shape of the container with definite volume.

[ii] It is slightly compressible.

[iii] It expands slightly when heated

[iv] It can diffuse when placed in a container.

A. [i] only.

B. [i], [ii], [iii], and [iv].

C. [i] and [iv] only.

D. [i], [ii], and [iii] only.

3. Which of the following is a compound?

A. Urine.

B. Soil.

C. Sand.

D. Blood.

4. The technique used for the separation of miscible liquids is by _____

A. the use of separating funnel.

B. distillation.

C. chromatography.

D. fractional distillation.

5. Which of the following is the correct criteria to determine the purity of a substance?

[i] Melting point.

[ii] Boiling point.

[iii] A spot on a paper chromatogram.

A. [i] only.

B. [i], [ii], and [iii].

C. [ii] and [iii] only.

D. [i] and [ii] only.

6. Which of the following characteristics of chemical changes given below are correct?

[i] It is not easily reversible because chemical bnds are formed

[ii] One or more new substances are formed

[iii] There is a change in mass of the original substances

[iv] There is a great amount of heat change.

A. [i] and [iv] only.

B. [i], [ii], and [iii].

C. [ii] and [iii] only.

D. [i], [ii], [iii] and [iv].

7. The separation of a soluble solid from a solution involving heat is known as _____

A. precipitation.

B. evaporation.

C. fractional crystallization.

D. crystallization.

8. An element is _____

A. a pure substance.

B. composed of two type of substance.

C. an impure substance.

D. a substance that can be split into simpler units by an ordinary chemical process.

9. The separation of a soluble solid which contains water of crystallization from a solution is known as _____

A. evaporation.

B. precipitation.

C. crystallization.

D. fractional crystallization.

10. Which of the following methods is used in separating a mixture of palm wine and water?

A. Crystallization.

B. Decantation.

C. Distillation.

D. Filtration.

11. The separation of soluble solids from a solution with different solubilities is known as _____

A. crystallization.

B. fractional crystallization.

C. precipitation.

D. evaporation.

12. Matter can be classified into _____, _____ and _____

A. elements, solid and gas.

B. solid, liquid and gas.

C. elements, compounds and mixtures.

D. solid, compounds and mixtures.

13. If all the electrons are paired then it is _____

A. paramagnetic.

B. diamagnetic

C. neutral.

D. positive.

14. The correct procedure for separating a mixture of sand, sodium chloride and ammonium chloride is _____, _____, _____ and _____

A. heat, add water, filter and evaporate.

B. heat, add water, evaporate and filter.

C. add water, filter and evaporate.

D. add water and evaporate.

15. The following options are characteristics of compounds except _____

A. the properties are the sum of those of its individual constituents.

B. homogeneous.

C. the component substances are chemically bound together and cannot be separated by physical means.

D. the properties differ entirely from those of its component substances.

16. Who discovered the atom?

A. Rutherford.

B. Dalton.

C. Neils Bohr.

D. Goldstein.

17. A sample of orange juice is suspected to have been contaminated with a yellow dye. Which of the following methods can be used to detect the dye?

A. Chromatography.

B. Decantation.

C. Distillation.

D. Evaporation.

18. The method of seperating lead (II) and copper (II) ions by adding dilute hydrochloric acid is known as _____

A. chromatography.

B. crystallisation.

C. decantation.

D. precipitation.

19. The technique used for the separation of immiscible liquids is _____

A. distillation.

B. chromatography.

C. the use of separating funnel.

D. fractional distillation.

20. Which of the following is a mixture?

A. Hard soap.

B. Milk.

C. Sugar.

D. Sand.

21. The separation of solutes from a solution is by _____

A. chromatography.

B. distillation.

C. fractional distillation.

D. the use of separating funnel.

22. From the following methods of separating substances, select the most suitable separating method to obtain salt from sea water?

A. Fractional Distillation.

B. Evaporation.

C. Filtration.

D. Paper Chromatography.

23. From the following methods of separating substances, select the most suitable for separating a mixture of petrol and paraffin?

A. Evaporation.

B. Filtration.

C. Fractional Distillation.

D. Paper Chromatography.

24. Which of the following statements below is/are correct characteristics of solids?

[i] It is incompressible.

[ii] It expands slightly when heated.

[iii] It has definite shape and volume.

A. [ii] only.

B. [i] and [iii] only.

C. [i], [ii], and [iii].

D. [ii] and [iii] only.

25. Which of the following option is not a chemical change?

A. the dissolution of metals and limestone in acids.

B. fermentation and decay of substances.

C. changes in the states of matter such as the sublimation of solids.

D. the addition of water to quicklime.

26. Who discovered the nucleus and proposed the first atomic model?

A. J.J.Thomson.

B. Rutherford.

C. Max Plank.

D. Julius Plucker.

27 From the following methods of separating substances, select the most suitable for separating the various colours in red rose petals?

A. Paper Chromatography.

B. Evaporation.

C. Filtration.

D. Fractional Distillation.

28. You are given a mixture of xylene and a dilute aqueous solution of potassium chloride. Xylene boils 140°C. Xylene is immiscible with water. Which of the following methods would you use to separate the mixture as far as possible?

A. Filtration.

B. Use of a separating funnel.

C. Distillation.

D. Sublimation.

29. The separation of insoluble solid from a liquid using a filter paper is known as _____

A. decantation.

B. crystallization.

C. centrifugation.

D. filtration.

30. The separation of insoluble solid from a liquid with a machine is called _____

A. Decantation.

B. Filtration.

C. Centrifugation.

D. Crystallization.

31. A compound is _____

A. a substance which cannot be split into simpler units by an ordinary chemical process.

B. a substance which contains two or more elements chemically combined together.

C. composed of one type of substance with definite chemical composition and well defined properties.

D. composed of more than one type of substance separated from one another by physical methods.

TOPIC: SHAPES OF MOLECULES AND SOLIDS

DIRECTION: Choose the correct answer from the lettered options.

1. The shapes of molecules include the following except _____

A. linear.

B. tetrahedral.

C. circular.

D. angular.

2. The power of an atom in a molecule to attract electrons to itself is known as _____

A. electron affinity.

B. electronegativity.

C. electron cloud.

D. all of the above.

3. The structure in which there is a particle at each corner and one in the centre of each face of the cube is known as _____

A. face-centred cubic.

B. hexagonal cubic.

C. simple cubic.

D. body-centred cubic.

4. Why would you expect water and ethanol to mix easily because of the _____

A. hydrogen bonds.

B. van der Waals forces.

C. dipole-dipole attractions.

D. intermolecular forces.

5. The attraction between the positive and negative ends of a polar molecule is called _____

A. Van der waals forces.

B. dipole-dipole attractions.

C. hydrogen bonding.

D. none of the above.

6. Which of the following molecules has a linear shape?

A. CH_4.

B. CO_2.

C. H_2S.

D. NH_3.

7. Which of these options is false about shapes of molecules/ions?

A. Methane is tetragonal.

B. Ammonium is tetragonal.

C. Ammonia is trigonal.

D. Water is linear molecule

8. Which of the following molecules has a triple bond in its structure?

A. CH_4.

B. NH_3.

C. N_2.

D. O_2.

9. These are intermolecular bonds or attractions except _____

A. metallic bond.

B. dipole-dipole attractions.

C. van der Waals forces.

D. hydrogen bond.

10. These have linear molecule shapes except _____

A. Cl_2.

B. HCl.

C. CO_2.

D. H_2O.

11.The major contribution of dipole to covalent molecule is to _____

A. confer partial ionic character.

B. confer partial non-polar character.

C. confer basic character.

D. confer acidic character.

12. The tendency of the layers of metallic ions to slide over one another without shattering the crystal lattice is a characteristic of a metal which is _____ and _____

A. malleable, strong.

B. ductile, weak.

C. malleable, ductile.

D. metallic, metallic crystal.

13. The following molecules contain hydrogen bonding except _____

A. ammonia.

B. ethanoic acid.

C. ethanol.

D. hydrogen fluoride.

14. Dihydrogen monoxide is the chemical name for _____

A. hydrogen peroxide.

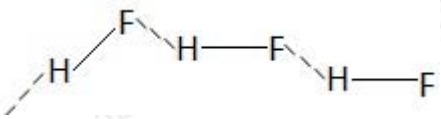
B. carbon monoxide.

C. water.

D. carbon dioxide.

Use the diagram to answer the question.

15. Which type of bond is represented by the dotted lines in the structure?



A. Covalent bond.

B. Dative bond.

C. Electrovalent bond.

D. Hydrogen bond.

16. The following except _____ are factors that determine the polarity of a molecule.

A. the polarity of the ionic bond.

B. the number and position of lone pairs.

C. the shape of the molecule.

D. the polarity of the covalent bond.

17. The following are factors responsible for the shapes of molecules except _____

A. overlapping of electrons during sharing of electrons.

B. Two unpaired electrons and a lone pair in its valence shell.

C. number of electron pairs in the valence shell of its central atom.

D. Two lone pairs and two unpaired electrons in its valence shell.

18. Which of the following is an example of an ionic solid?

A. Graphite.

B. Copper (II) tetraoxosulphate (VI).

C. Sulphur (IV) oxide.

D. Naphthalene.

19. All of these options with the exception of _____has no hydrogen bond.

A. NH_3.

B. HF.

C. H_2O.

D. CH_4.

20. Which of the following is an example of a face centred cubic packing?

A. Aluminium.

B. Magnesium.

C. Lithium.

D. Sodium.

21. Covalent molecules are directional because _____

A. there is sharing.

B. there is overlap of two atomic orbitals.

C. there is overlap of shared clouds.

D. most of them face x and y axes.

22. The force of attraction holding sulphur (IV) oxide is _____

A. hydrogen bonding.

B. dipole-dipole attractions.

C. van der Waals.

D. none of the above.

23. Which of the following compounds has a three dimensional tetrahedral shape?

A. Benzene.

B. Carbon (IV) oxide.

C. Ethene.

D. Methane.

24. Basic particles constituting different solids are _____

A. ions.

B. molecules.

C. atoms.

D. radicals.

25. Crystal lattice is the _____

A. One dimensional arrangement of the particles.

B. Three dimensional arrangement of the particles.

C. Two dimensional arrangement of the particles.

D. none of the above.

26. Polarization is _____

A. the unequal sharing of electrons by atoms of elements in a molecule.

B. the equal sharing of electrons by atoms elements in a molecule.

C. the loss and gain of electrons by atoms of elements in a molecule.

D. the sharing of electrons by atoms elements in a molecule.

27. The following are factors which determine whether a molecule is polar or non-polar except _____

A. the shape of the molecule.

B. number of lone pairs in an atom.

C. the number of electronegative elements present.

D. polarity of the covalent bond.

28. The forces existing between moleules are known as _____

A. Van der Waals forces.

B. molecular forces.

C. intermolecular forces.

D. interactive forces.

29. The bonds in crystalline ammonium chloride are _____

A. covalent and dative.

B. ionic and covalent.

C. ionic, covalent and dative.

D. ionic, covalent and hydrogen bond.

30. The following are examples of van der Waals forces except _____

A. naphthalene.

B. iodine.

C. dry ice.

D. hydrogen fluoride.

31. _____ are made up of atoms joined to one another by covalent bonds to form a giant lattice.

A. Ionic solids

B. Molecular solids

C. Covalent solids

D. Metallic solids

32. These are examples of unit cell cubic structure except _____

A. simple cubic structure.

B. non-linear cubic structure.

C. face-centered cubic structure.

D. body-centered cubic structure.

33. The valence shell of water molecule contains _____

A. One lone pair and two unpaired electrons.

B. Two lone pairs and two unpaired electrons.

C. Two lone pairs and a single unpaired electrons.

D. single lone pair and a single unpaired electrons.

34. The weak forces of attraction which are independent of normal bonding forces between non-polar molecules is known as _____

A. dipole-dipole attractions.

B. intermolecular forces.

C. molecular forces.

D. Van der Waals forces.

35. The following are examples of substances which are deflected by a non-uniform electrostatic field except _____

A. water.

B. ethanol.

C. benzene.

D. trichloromethane.

36. The structure in which there is a particle at each corner and one at the centre of the cube is known as _____

A. simple cubic.

B. face-centered cubic.

C. hexagonal cubic.

D. body-centered cubic.

TOPIC: STATES OF MATTER

DIRECTION: Choose the correct answer from the lettered options.

1. A sample of gas exerts a pressure of 8.2 atm. when confined in a 2.93 dm^3 container at 20°C. The number of moles of gas in the sample is _____

A. 1.00.

B. 2.00.

C. 3.00.

D. 4.00.

2. Helium is often used in observation balloons because it is _____

A. light and combustible.

B. light and non-combustible.

C. heavy and combustible.

D. heavy and non-combustible.

3. The relative randomness of molecules in the states of matter is best indicated by _____

A. solids > liquids > gas.

B. liquid > gas > solid.

C. liquid > solid > gas.

D. gas > liquid > solid.

A sample of orange juice is suspected to have been contaminated with a yellow dye.

4. Which of the following methods can be used to detect the dye?

A. Decantation.

B. Chromatography.

C. Distillation.

D. Filtration.

5. 30 cm3 of hydrogen was collected over water at 27°C and 780mmHg. If the vapour pressure of water at the temperature of the experiment was 10mmHg, the volume of the gas at 760mmHg and 7°C is _____

A. 40.0cm$^{3.}$

B. 35.7cm$^{3.}$

C. 28.4cm$^{3.}$

D. 25.2cm$^{3.}$

6. Boyles law can be expressed mathematically as _____

A. V a 1/P (T constant).

B. V1/T1 = V2/T2.

C. V a T (P constant).

D. P a V (T constant).

7. Which of the following is not a basic postulate of the kinetic theory of gases?

A. Molecules in a gas have negligible volume.

B. Particles of a gas repel each other.

C. The gas particles have no attractive forces.

D. Pressure of a gas originates from the collision of the gas particles against the vessel walls.

8. The following are true of compounds except that _____.

A. the component elements are chemically bounded together

B. the components are present in a fixed ratio by mass

C. the properties of the compound differ entirely from those of the component elements

D. it is either homogeneous or heterogeneous

9. A mixture of 0.20 mole of Ar, 0.20 mole of N2 and 0.30 mole of He, exerts a total pressure of 2.1 atm. The partial pressure of He in the mixture is _____

A. 0.90 atm.

B. 0.70 atm.

C. 0.80 atm.

D. 0.60 atm.

10. The phenomenon observed when dust particles collide randomly in a beam of sunlight is known as _____

A. tyndal effect.

B. diffusion.

C. osmosis.

D. Brownian movement.

11. Complete combustion of wax by a candle flame would yield _____

A. water and carbon monoxide.

B. water and carbon dioxide.

C. carbon black and water.

D. carbon, hydrogen gas, oxygen gas.

12. The common features between gas and paper chromatography include _____

A. static and moving phase.

B. stationary and moving phase.

C. long and short phase.

D. paper and chromatic phase.

13. The Avogadro number of 24g of magnesium is the same as that of _____.

A. 1g of hydrogen molecules

B. 16g of oxygen molecules

C. 32g of oxygen molecules

D. 35.5g of chlorine molecules

14. A device used in the laboratory for intermittent production of gases without heating is _____

A. Liebig condenser.

B. aspirator.

C. delivery tube.

D. Kipp's apparatus.

15. All pure samples of the same chemical compound contain the same elements in the same proportion by mass is a statement of _____

A. the law of conservation of matter.

B. the law of constant composition.

C. the law of multiple proportions.

D. Gay-Lussac's law.

16. Which of the following is a colligative property?

A. Boiling point.

B. Freezing point.

C. Osmotic pressure.

D. Vapor pressure.

17. Which of the following gases will rekindle a brightly glowing splint?

A. NO_2

B. NO

C. N_2O

D. Cl_2

18. The following are characteristics of physical changes except _____

A. It is easily reversible.

B. No new substances are formed.

C. It is not easily reversible.

D. It does not involve any great heat change.

19. Crystallization is most needed in _____

A. drug making.

B. cement making.

C. paint making.

D. perfume making.

20. A substance is said to be pure if _____

(I) it is colourless.

(II) it is soluble in water.

(III) it's specific gravity is higher than 1.

(IV) it's melting point is sharp.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

21. Which of these statements is true concerning solids?

A. Metallic solids tend to have low melting and boiling points.

B. The attractive forces are low between the atoms, ions, or molecules of a solid.

C. A crystalline solid has an ordered structure, while an amorphous solid has no ordered arrangement.

D. All of the above .

22. The 'triple point' is _____

A. the combination of temperature and pressure at which the solid, liquid, and gas phases can co-exist at equilibrium.

B. the combination of temperature and pressure at which liquid, gas, and plasma phases all exist at equilibrium.

C. the combination of standard temperature, pressure, and volume.

D. the combination of temperature and pressure at which liquids and gases cannot be distinguished from each other.

23. A pure solid usually melts _____

A. over a wide range of temperature.

B. over a narrow range of temperature.

C. at a lower temperature than that of an impure one.

D. at the same temperature as the impure one.

24. Pure water can be best obtained from dirty river water by _____.

A. filtration

B. chromatography

C. sublimation

D. distillation

25. PTotal = $P_1 + P_2 + P_3 + ... + Pn$, where PTotal is the pressure of a mixture of gases.

The equation above is an expression of _____

A. Graham's law.

B. Boyle's law.

C. Gay-Lussac's law.

D. Dalton's law.

26. The technique that can be used to separate lead (II) chloride from water is _____.

A. chromatography.

B. distillation.

C. sieving.

D. crystallization.

27. Separating funnel is used for separating a mixture of _____

A. liquids with different boiling points.

B. sediments in a liquid.

C. liquids with different colours.

D. liquids that are immiscible.

28. The following are characteristics of chemical changes except _____.

A. it is not easily reversible

B. it is easily reversible

C. there is a change in the mass of the substance used

D. a considerable amount of heat change is involved

29. If 1.0 dm3 of gas X diffuses through a porous plug in 60 seconds while the same volume of hydrogen diffuses in 15 seconds under the same conditions, the relative molecular mass of X is _____

[H = 2]

A. 4.0g.

B. 8.0g.

C. 16g.

D. 32g.

30. Sublimation is _____

A. the process from when a solid turns into a gas.

B. the process from when a gas turns into a solid.

C. the process from when a gas turns into a liquid .

D. the process from when a liquid turns into a gas.

31. The method of collection of gas depends on it's _____

(I) boiling point.

(II) odour.

(III) density.

(IV) solubility.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

32. Which one of the following is not a chemical change?

A. Burning natural gas.

B. Boiling an egg.

C. Corrosion of steel.

D. Distilling salt water solution

33. According to the kinetic theory, an increase in temperature causes the kinetic energy of particles to _____

A. be zero.

B. remain constant.

C. increase.

D. decrease.

34. What is the percentage by mass of sulphur in $Al_2(SO4)3$?

[$Al_2(SO4)3$ = 342 g/mol, S = 32g].

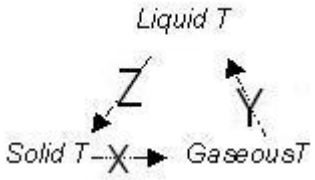
A. 9.36%.

B. 14.71%.

C. 21.3%/.

D. 28.07%.

35. Changes in the physical states of a chemical substance T, are shown in the schematic diagram drawn. The letters X, Y, Z respectively represent _____, _____ and _____



A. sublimation, condensation, and freezing.

B. sublimation, vapourization, and freezing.

C. evaporation, liquefaction and solidification.

D. liquefaction, vaporization and solidification.

36. An emulsion paint consists of _____.

A. gas or liquid particles dispersed in liquid

B. liquid particles dispersed in liquid

C. solid particles dispersed in liquid

D. solid particles dispersed in solid

37. O K is _____

(a) the freezing point of water.

(b) -273oC.

(c) zero Kelvins.

(d) -180oC.

A. b only.

B. a & c.

C. c & d.

D. a, b & c.

38. Chromatography is used to separate components of mixtures, which differ in their rates of _____

A. diffusion.

B. migration.

C. reaction.

D. sedimentation.

39. Molecules which are non-linear include _____

(I) methane.

(II) ammonia.

(III) hydrogen.

(IV) oxygen.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

40. Which of the following is not a pure substance?

A. Molten sodium chloride.

B. Sodium chloride solution.

C. Sodium chloride solid.

D. Sodium chloride vapor.

41. Which of the following options is the correct list of materials?

(I) Liquid oxygen

(II) Soap solution.

(III) Brass.

(IV) Silver.

(V) Petrol.

A. I, III and IV are elements.

B. II, III and V are mixtures.

C. III and IV are elements.

D. III and V are compounds.

42. Dissolving salt in water is an example of which type of change?

A. Physical.

B. Nuclear.

C. Chemical.

D. Metallic.

43. Which temperature scale is an absolute scale that also has its zero point as the lowest possible temperature?

A. Kelvin

B. Celsius

C. Fahrenheit

D. All of the above

44. Pure solvents are obtained by _____

A. distillation.

B. condensation.

C. extraction.

D. evaporation.

45. A mixture of oil and water can easily be separated by _____.

A. the use of a seperating funnel

B. evaporation

C. fractional crystallization

D. decantation

46. In any chemical reaction, the total mass of the products is always equal to that of the reactants. This is a statement of the law of _____

A. definite proportions.

B. conservation of matter.

C. multiple proportions.

D. reciprocal proportions.

47. Which of the following statements is correct about the average kinetic energy of the molecules of a gas?

A. It increases with increase in pressure.

B. It increases with constant pressure.

C. It increases with increase in temperature.

D. It increases with increase in volume.

48. An emulsion is _____

A. another name for a solution of two miscible fluids.

B. a mixture of two immiscible fluids that is evenly mixed so that it is fairly homogenous.

C. formed when mixing two fluids that attract each other due to their polarity.

D. A and C.

Cylinders A and B are identical. 20.0 g of O2 (molar mass = 32.0 g mol-1) is introduced into cylinder A and 20.0 g of N2 (molar mass = 28.0 g mol-1) is introduced into cylinder B. Both cylinders are then closed.

49. The temperature of _____

A. the gas pressure in the O2 cylinder is higher than that in the N2 cylinder.

B. the gas pressure in the O2 cylinder is lower than that in the N2 cylinder.

C. the gas pressure in the two cylinders is equal.

D. the pressures cannot be compared without knowing the temperature.

50. The most suitable method used when separating an insoluble solid from a liquid is _____

A. evaporation.

B. filtration.

C. magnetization.

D. sublimation.

51. Which type of change occurs when the size, shape, appearance, or volume of a substance is changed without changing its composition?

A. Chemical.

B. Physical.

C. Metallic.

D. Atomic.

52. Which of these options is the odd one out?

A. Air.

B. Urine.

C. Brass.

D. Sand.

53. Which of the following are elements?

(a) Water

(b) Sugar

(c) Table salt (NaCl).

(d) The atmosphere.

A. a, d.

B. b, d.

C. b only.

D. none of the above.

54. What volume of oxygen at s.t.p would react with carbon to form 4.40g of CO_2 according to the following equation?

$C_{(s)} + O_{2\ (g)} \rightarrow CO_{2\ (aq)}$

[O = 16, C = 12, 1 mole of a gas occupies 22.4 dm^3 at s.t.p.]?

A. 0.224 dm^3.

B. 2.24 $dm^{3.}$

C. 4.40 dm^3.

D. 4.48 dm^3.

55. Which of the following are chemical changes?

(a) Milk souring.

(b) Silver tarnishing.

(c) Butter melting.

(d) Coal burning.

A. a, b & d.

B. b, c & d.

C. a & b.

D. all of the above.

56. The following statements are true of mixtures except _____.

A. the constituents are not chemically bounded

B. the constituents can be added together in any ratio by mass

C. the properties of the mixture are the sum of the individual constituents

D. it is always homogeneous

57. Petrol and water mixture can be separated using _____

A. separating funnel.

B. evaporation.

C. chromatography.

D. decantation.

58. If the temperature T°C of an ideal gas is increased to $(^3/_2)$T°C at constant volume V, its pressure P will change to _____

A. $(^2/_3)$P.

B. $P[\frac{(273 + \frac{3}{2}T)}{(273 + T)}]$

C. $(^3/_2)$P(273 + T).

D. $^{3P}/_{2T}$.

59. Which of the following are units of volume?

(a) kJ.

(b) m3.

(c) atm.

(d) ml.

A. c & d.

B. b & d.

C. a, b & d.

D. b & c.

60. The following are physical changes except _____

A. changes in the states of matter.

B. seperation of mixtures.

C. fermentation of substances.

D. demagnetization of iron.

61. When an element can exist in two or more forms in the same physical state, the element is said to exhibit _____.

A. isotopy.

B. isomerism.

C. allotropy.

D. hygroscopy.

62. Which of the following list below represents some common processes?

(I) Boiling of an egg.

(II) Rusting of iron.

(III) Distilling sea water.

(IV) Adding water to a solution of copper (II) sulphate.

A. All the listed processes are chemical changes

B. Only II is a chemical change

C. Only I and II are chemical changes.

D. Only II and IV are chemical changes.

63. Which one of the following observations would not be evidence for a chemical reaction?

A. Formation of a precipitate.

B. Evolution of a gas.

C. Melting of a solid.

D. Colour change.

64. Which of the following are heterogeneous compounds?

(a) Gold.

(b) Gasoline.

(c) A solution of ethanol and water.

(d) Water.

A. a, c.

B. b, c.

C. a, b, d.

D. none of the above.

65. Which of the following movements can be described as a random motion?

A. A wheelbarrow being pushed.

B. A car traveling on a straight line.

C. Gas molecules colliding in a flask.

D. Planets going round the sun.

66. Gas molecules are said to be perfectly elastic because _____

A. they collide without loss of energy.

B. they move about in straight lines.

C. the distances between them are negligible.

D. the volume occupied by them is negligible.

67. The components of universal indicator can be best separated by _____

A. chromatography.

B. filtration.

C. evaporation.

D. crystallization.

68. What is the temperature of a given mass of a gas initially at 0^0C and 9 atm., if the pressure is reduced to 3 atm. at a constant volume?

A. 91K.

B. 182K.

C. 273K.

D. 819K.

69. A _____ state of matter will undergo the same amount of expansion for a given increase in temperature.

A. solid

B. liquid

C. gas

D. all of the above

70. A given quantity of gas occupies a volume of 228 cm^3 at a pressure of 750 mmHg. What will be it's volume at atmospheric pressure?

A. 220 cm^3.

B. 225 $cm^{3.}$

C. 230 $cm^{3.}$

D. 0.235 $cm^{3.}$

71. Equal volumes of all gases at the same temperature and pressure contain the same number of molecules is an expression of _____

A. Charles' law.

B. Boyle's law.

C. Graham's law.

D. Avogadro's law.

72. A saturated solution of potassium chloride was prepared at X°C. If 30 cm^3 of this solution required 22.5 cm^3 of silver trioxonitrate (V) solution, containing 34 g in 100 cm^3 solution, for complete precipitation, the solubility of potassium chloride at X°C in mol dm^{-3} is _____.

[take KCl = 74.5, $AgNO_3$ = 170]

A. 1.5 mol dm^{-3}.

B. 2.0 mol dm^{-3}.

C. 0.15 mol dm^{-3}.

D. 0.20 mol dm^{-3}.

73. _____ can be used to separate mixtures of solids of various sizes.

A. Rusting

B. Sieving

C. Sublimation

D. Coarsing

74. The volume of a balloon containing a certain amount of an ideal gas at 5.0 atm pressure is V1 litres at 25°C. Which of the following will be the volume, V2, of the balloon if the temperature is kept constant and the pressure changed?

A. $V_1 = V_2 \times 2$

B. $V_2 = V_1 \times 0.5$.

C. $V_2 = V_1 \times (273+25)$

D. $V_2 = V_1 \times {}^{1}/_{(273)}$

75. A sample of juice is suspected to have been contaminated with a yellow dye. Which of the following methods can be used to detect the dye?

A. Decantation.

B. Chromatography.

C. Distillation.

D. Filtration.

76. A liquid begins to boil when _____

A. it's vapour pressure is equal to the vapour pressure of it's solid at the given temperature.

B. molecules start escaping from it's surface.

C. it's vapor pressure equals the atmospheric pressure.

D. it's volume is slightly ionic.

77. This implies that _____

A. collisions are perfectly elastic.

B. forces of repulsion exist.

C. forces of repulsion and attraction are in equilibrium.

D. collisions are inelastic.

78. Which of the following is a measure of the average kinetic energy of the molecules of a substance?

A. Volume.

B. Pressure.

C. Mass.

D. Temperature.

79. The formation of water from oxygen and hydrogen is an example of a _____ change.

A. chemical

B. physical

C. atomic

D. nuclear

80. Which of the following gases is colourless, odourless and soluble in potassium hydroxide solution?

A. NO_2.

B. SO_2.

C. NH_3.

D. CO_2.

81. Separation of mixture of solids by physical methods can be based on differences in the following except _____

A. melting point.

B. solubility.

C. particle size.

D. molar mass.

82. The ratio of the initial to the final pressure of a given mass of gas is 1 : 1.5. The final volume of the gas is _____, if the initial volume was 300cm^3 at the same temperature.

A. 120cm^3.

B. 200cm^3.

C. 450cm^3.

D. 750cm^3.

83. The following methods are tests for purity except _____

A. melting point.

B. centrifugation.

C. boiling point.

D. temperature.

84. In one mole of hydrogen H_2, the Avogadro's number is _____.

A. H atoms

B. electrons

C. H_2 molecules

D. neutrons

85. Fractional distillation is a method of separating _____

A. crude oil.

B. liquid-liquid mixture.

C. coal.

D. mixture of different solubility in a liquid.

86. Which of the following substances is a mixture?

A. Sulphur powder.

B. Bronze.

C. Distilled water.

D. Ethanol.

87. Which of the following statements are correct of the gaseous state?

(I) The intermolecular spaces are very large.

(II) The molecules move very fast.

(III) The intermolecular forces are negligible.

(IV) The intermolecular space can be compressed.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

88. The ideal gas equation can be written as _____

A. PV = nRT.

B. $P_1V_1 = P_2V_2$

C. $V_2 = {}^{(P_1V_1T_1)}/_{(P2T2)}$.

D. $P_1V_1T_1 = P_2V_2T_2$

89. If 20 cm3 of distilled water is added to 80 cm^3 of 0.50 mol dm^{-3} hydrochloric acid, the concentration of the acid will change to _____

A. 0.20 mol dm^{-3}.

B. 0.40 mol $dm^{-3.}$

C. 2.00 mol $dm^{-3.}$

D. 5.00 mol $dm^{-3.}$

90. At a given temperature and pressure a gas, A, diffuses twice as fast as a gas, B. It follows that _____

(I) gas B is heavier than gas A.

(II) Gas B is four times as heavy as gas A.

(III) Gas B is monoatomic.

(IV) Gas A is diatomic.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

91. Which of the following are pure substances?

(a) Wine.

(b) Water.

(c) Blood.

(d) Iron.

A. b, d.

B. b, c, d.

C. b only.

D. d only.

92. Which of the following statements is not correct?

A. A chemical change is irreversible and a new substance is formed

B. A physical change is reversible and no new substances are formed

C. separating a mixture by distillation is an example of a physical change

D. The addition of water to quicklime is an example of a physical change

TOPIC: STOICHIOMETRY AND CHEMICAL REACTIONS

DIRECTION: Choose the correct answer from the lettered options.

1. According to the given balanced chemical reaction below, how many grams of oxygen are produced when 29.20g of water is decomposed?

$2H_2O\ (l) \rightarrow 2H_2(g) + O_2(g)$

A. 2.595g

B. 25.95g

C. 32.85g

D. 3.285g

2. On heating 20g sample of hydrated salt, $Na_2CO_3.XH_2O$, strongly, 5.5g of the anhydrous salt was obtained, what is the value of x in the hydrated salt solved from one of the expressions?

A. $\frac{5.5}{20} = \frac{106}{106 + 18X}$

B. $\frac{20}{5.5} = \frac{106}{106 + 18X}$

C. $\frac{106}{5.5} = \frac{20}{106 + 18X}$

D. $\frac{106}{5.5} = \frac{18X}{20}$

3. Which of the following options has the largest mass of carbon per gram?

A. H_2CO_3

B. CH_3CO_2H

C. CH_3OH

D. CH_3CH_2OH

4. A compound has an empirical formula of $NPCl_2$ and a molecular weight of 347.66. What is its molecular formula?

A. $NPCl_2$

B. $N_2P_2Cl_2$

C. $N_3P_3Cl_6$

D. You cannot determine the molecular formula from this information.

5. An excess of a divalent metal M was dissolved in a limited volume of hydrochloric acid. If 576 cm^3 of hydrogen were liberated at s.t.p., what was the mass of the metal that produced this volume of hydrogen?

(M = 24, H = 1, molar volume of a gas at s.t.p. = 22.4 dm^3)

A. 617.14g

B. 6.174g

C. 0.6174g

D. 61.74g

6. What is the balanced equation for Mg and CO_2?

A. $2Mg + CO_2 \rightarrow Mg_2O + CO$

B. $Mg + CO_2 \rightarrow MgO_2 + C$

C. $2Mg + CO_2 \rightarrow 2MgO + C$

D. $Mg + CO_2 \rightarrow MgO + CO$

7. A metal X with relative atomic mass 56 forms an oxide with formula X_2O_3. How many grams of the metal will combine with 10g of oxygen?

(O = 16)

A. 23.52g

B. 11.76g

C. 35g

D. 17.5g

8. Calculate the number of moles of magnesium chloride produced by reacting 168g of magnesium trioxocarbonate (IV) with excess hydrochloric acid.

(Mg = 24, C = 12, O = 16, H = 1, Cl = 35.5)

A. 4m

B. 3m

C. 2m

D. 1m

9. Find the mass concentration of 1 mol dm^{-3} potassium hydroxide solution.

(K = 39, H = 1, O = 16, N = 14, Na = 23, C = 12)

A. 56g

B. 56g dm^{-3}

C. 55g

D. 56mol dm^{-3}

10. One atom of an element has a mass of 9.123 x 10^{23}g. There is only one isotope of the element. The element is _____.

A. argon

B. magnesium

C. chromium

D. manganese

11. A gas occupies a volume of 30.0 dm^3 at s.t.p. What volume in dm3 would it occupy at 91°C and 380 mmHg?

A. 40dm^3.

B. 80dm^3.

C. 100dm^3.

D. 112dm^3.

12. The balanced chemical equation for the reaction of copper (Cu) and sulfuric acid (H_2SO_4) is given below;

$Cu(s) + H_2SO_4(aq) \rightarrow CuSO_4(s) + H_2(g)$

how many grams of $CuSO_4$ would be produced from 128.00g of copper metal?

A. 217.30g

B. 318.51g

C. 162.43g

D. 432.53g

13. Volumetric analysis may be used in the determination of the following except _____.

A. molar mass of a metal acid or base

B. percentage purity or impurity of a given salt solution

C. solubility of a substance in aqueous medium

D. water of crystallization of anhydrous salt solution

14. A further 26.0 ml of water is added to 402.89 ml of water. What is the final volume (stated to four significant figures)?

A. 428 ml.

B. 428.9 ml.

C. 429 ml.

D. 429.89 ml.

15. When solute B is added to pure solvent A _____

A. the vapour pressure of A above the solvent remains unchanged.

B. the vapour pressure of A above the solvent decreases.

C. the vapour pressure of A above the solvent increases.

D. none of the above.

16. The mass of carbon in grams needed to reduce 15.9g of copper (II) oxide is _____

[Copper = 63.5, O = 16]

A. 1.20

B. 2.40

C. 2.50

D. 2.56

17. Which of the following options has the greatest mass?

A. 200 molecules of water

B. 100 atoms of Fe

C. 200 molecules of O_2

D. 200 molecules of CH_4

18. A solution of trioxonitrate (V) acid contained 0.67g in 100cm^3. 31.0cm^3 of this solution neutralized 25 cm3 of a sodium trioxocarbonate (IV) solution. Calculate the concentration of the trioxocarbonate (IV) solution.

(HNO_3 = 63, Na_2CO_3 = 106)

A. 0.066M

B. 0.131M

C. 0.00066M

D. 0.00131M

19. 12g of a mixture of anhydrous sodium trioxocarbonate (IV), Na_2CO_3, and sodium chloride, NaCl, were made up to 1dm^3 of aqueous solution 25cm^3 of this mixture were neutralized by 20cm^3 of 0.2M hydrochloric acid, HCl. Find the percentage purity of the trioxocarbonate (IV) sample.

(Na_2CO_3 = 106, HCl = 36.5)

A. 45.3%

B. 70.7%

C. 90.6%

D. 77.5%

20. A balanced chemical equation obeys the law of _____

A. conservation of mass.

B. definite proportions.

C. multiple proportions.

D. conservation of energy.

21. A solution of sodium trioxocarbonate (IV) contains 10.6g in 250 cm^3 of solution. Calculate the concentration of the solution.

[Na_2CO_3 = 106.0]

A. 0.4 mol dm^{-3}.

B. 1.0mol dm^{-3}.

C. 10.6mol dm^{-3}.

D. 25.0mol dm^{-3}.

22. If a hydrated salt weighs x grams and water recovered after strong heating in y grams, the formula for determining the percentage of water of crystallization is _____.

A. $\frac{x}{y} \times \frac{100}{1}\%$

B. $\frac{y}{x} \times \frac{100}{1}\%$

C. 100x%

D. $\frac{y}{x} \times \frac{100}{1}\%$

23. 12g of a mixture of anhydrous sodium trioxocarbonate (IV), Na_2CO_3, and sodium chloride, NaCl, were made up to 1dm^3 of aqueous solution 25 cm^3 of this mixture were neutralized by 20cm^3 of 0.2M hydrochloric acid, HCl. Calculate the mass of the sodium chloride impurity.

(Na_2CO_3 = 106, HCl = 36.5)

A. 26.5g

B. 3.52g

C. 8.48g

D. 16.96g

24. If the fertilizers listed below are priced according to their nitrogen content, which will be the least expensive per 50g. bag?

A. Urea $(NH_2)2CO$

B. Ammonia NH_3

C. Ammonium nitrate NH_4NO_3

D. Guanidine $HNC(NH_2)2$

25. 12.5g of zinc trioxocarbonate (IV), $ZnCO_3$, were heated very strongly to a constant mass and the residue treated with excess hydrochloric acid, HCl. Calculate the mass of zinc chloride, $ZnCl_2$, that would be obtained.

(Zn = 65, C = 12, O = 16, H = 1, Cl = 35.5)

A. 13.6g

B. 10.05g

C. 20.1g

D. 27.2g

26. If 14.8g of a salt dissolved in $250cm^3$ of distilled water with a concentration of 0.80 $moldm^{-3}$. The molar mass of salt in $gmol^{-1}$ is _____

A. 74.0.

B. 13.5.

C. 14.8.

D. 47.4.

27. A solution of trioxonitrate (V) acid contained 0.67g in 100cm^3. 31.0cm^3 of this solution neutralized 25cm^3 of a sodium trioxocarbonate (IV) solution. Calculate the mass of the trioxocarbonate (IV) solution.

(HNO_3 = 63, Na_2CO_3 = 106)

A. 13.89g

B. 0.06996g

C. 6.996g

D. 0.1389g

28. Avogadro's number can be defined as the number of _____

(I) molecules in 22.4dm3 of a gas at s.t.p.

(II) Molecules in one mole of a compound.

(III) Electrons in 96500 coulombs of electricity.

(IV) Electrons in the outermost.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

29. What mass of anhydrous sodium trioxocarbonate (IV), Na2CO3, is present in 500 cm3 of 0.1 mol dm-3?

(Na = 23, C = 12, O = 16)

A. 10.6g

B. 21.2g

C. 5.3g

D. 106g

30. The balanced chemical equation for the reaction of nitrogen (N_2) and hydrogen (H_2) to form ammonia (NH_3) is given below;

$N_2 + 3H_2 \rightarrow 2NH_3$

how many grams of hydrogen would be required to react with 14.0g of nitrogen?

A. 1.0g

B. 6.0g

C. 27.0g

D. 2.0g

31. Which of the following gases contains the highest number of atoms at s.t.p?

A. 6 moles of neon.

B. 3 moles of oxygen.

C. 2 moles of chlorine.

D. 1 mole of ethane.

32. What is a molar solution?

A. Molar solution of a compound is one which contains the molar weight of a molecule in one dm^3 of the solution.

B. Molar solution of a compound is one which contains the relative atomicolecular mass of a compound in one dm^3 of the solution.

C. Molar solution of a compound is one which contains the molar mass of a molecule in one dm^3 of the solution.

D. Molar solution of a compound is one which contains the molar mass of a compound in one dm^3 of the solution.

33. Which of the following options is correct about the figure 1000?

(a) It contains four significant figures.

(b) It is the number of grams in a kilogram.

(c) It is equal to 1.000 x 104.

(d) It is the product of $(2.000 \times 10^{-4})(5.000 \times 107)$.

A. a, b, and c.

B. a and b.

C. b, c, and d.

D. b and c.

34. What is element Y in the following equation?

$^{14}_{7}N + {}^{4}_{2}He \rightarrow {}^{1}_{1}H + Y$

A. Fluorine.

B. Sodium.

C. Chlorine.

D. Oxygen.

35. Under which of the following reaction conditions will Mg be the limiting reagent of the following chemical reaction?

$Mg_{(s)} + I_{2(s)} \rightarrow MgI_{2(s)}$

A. 200 atoms of Mg and 160 molecules of I_2

B. 0.16 mol Mg and 0.25 mol I_2

C. 100 atoms of Mg and 100 molecules of I_2

D. 0.12 mol Mg and 0.08 mol I_2

36. What volume of oxygen in dm^{-3} would be required to burn completely 8.0g of methane according to the equation below?

$CH_4(g)$

$+ 2O_2(g)$

$\rightarrow CO_2(g) + 2H_2O(g)$

(Molar volume = $22.4dm^3$, C = 12, H = 1)

A. 2.8.

B. 5.6.

C. 11.2.

D. 22.4.

37. In a certain reaction, 0.20g of hydrogen gas combines with 3.20g of oxygen gas. If the relative molecular mass of the compound is 34.0, find its molecular formula.

(H = 1, O = 16)

A. H_2O

B. HO_2

C. H_2O_2

D. HO

38. What phenomenon does this equation show?

$Na_2CO_3.10H_2O \rightarrow Na_2CO_3.H_2O + 9H_2O$

A. Deliquiscence

B. Hygroscopy

C. Efflorescence

D. Decomposition

39. What volume of steam is produced when 10g of propyne is burnt in excess oxygen at s.t.p.?

A. 44.8dm

B. 11.2dm^3

C. 22.4dm^3

D. 11.2cm^3

40. 39.8g of a mixture of potassium chloride, KCl, and potassium trioxochlorate (V), KClO3, were heated to a constant mass. If the residue weighed 28.9g, what was the percentage mass of the potassium chloride in the mixture?

(K = 39, Cl = 35.5, O = 16)

A. 72.6%

B. 27.4%

C. 38.8%

D. 53.4%

41. How many molecules of zinc oxide would be produced when 23.5 g zinc sulfide is heated with excess oxygen?

A. 3.42×10^{23}

B. 1.46×10^{23}

C. 4.65×10^{23}

D. 2.82×10^{23}

42. An organic compound contains 40.0% carbon, 6.7% hydrogen and 53.3% oxygen. What is the empirical formula of the compound?

[O = 16.0, C = 12.0, H = 1.0]

A. C_2HO.

B. CHO.

C. CH_2O.

D. CHO_2.

43. The balanced chemical equation of the reaction of iron (Fe) and chlorine (Cl2) gas is given below;

$2Fe + 3Cl_2 \rightarrow 2FeCl_3$

how many molecules of iron (III) chloride are formed from 55.85 g of iron?

A. 1.024×10^{23}

B. 1.024×10^{24}

C. 6.00×10^{24}

D. 6.00×10^{23}

44. $3Cu + pHNO_3 \rightarrow 3Cu(NO_3)2 + 4H_2O + xNO$

In the equation above, the values of p and x respectively are _____ and _____

A. 6, 2.

B. 1, 3.

C. 8, 2.

D. 2, 3.

45. What is the volume occupied by 2 moles of ammonia at s.t.p?

A. 44.8 dm^{-3}.

B. 22.4 dm^{-3}.

C. 11.2 dm^{-3}.

D. 5.6 dm^{-3}.

46. Which of the following apparatus can be used to measure accurately a specific volume of a liquid?

A. Beaker.

B. Conical flask.

C. Measuring cylinder.

D. Pipette.

47. What is the percentage of carbon in two moles of calcium hydrogen trioxocarbonate (IV)?

[Ca = 20, H = 1, C = 12, O = 16]

A. 7.4.

B. 11.9.

C. 14.9.

D. 29.8.

48. Which of the following equations illustrates substitution reaction?

(I) $2CH_3CH_2OH + 2Na \rightarrow 2CH_3CH_2ONa + H_2$
(II) $C_2H_2 + 2CuCl \rightarrow C_2Cu_2 + 2HCl$
(III) $C_2H_2 + 2AgNO_3 \rightarrow C_2Ag_2 + 2HNO_3$
(IV) $Cu_2C_2 + H_2 \rightarrow C_2SO_4 + C_2H_2$

A. I & II

B. III & IV

C. I, II & III

D. I, II, III & IV

$Na_2CO_{3(s)} + 2HCl_{(aq)}$

$\rightarrow 2NaCl_{(aq)} + H_2O_{(l)} + CO_2(g)$

49. Using the equation above, what volume of carbon (IV) oxide in dm^3 measured at s.t.p. is liberated when 36g of sodium trioxocarbonate (IV) is dissolved in hydrochloric acid?

(1mole of gas occupies $22.4dm^4$ at stp)

{Na = 23, C = 12, O = 16}

A. 7.6.

B. 11.5.

C. 22.4.

D. 44.8.

50. These are volumetric analysis tools except _____

A. indicator

B. deflagrating spoon

C. white background for example white tile

D. wash bottle

51. Find the volume of oxygen produced by 1 mole of potassium trioxochlorate (V) at s.t.p. in the following reaction.

$KClO_{3(s)} \rightarrow KCl_{(s)} + O_{2(g)}$

A. 14.93 dm^3

B. 11.2 dm^3

C. 22.4 dm^3

D. 33.6 dm^3

52. What is the balanced equation for; $KClO_3$ to potassium chloride and oxygen?

A $KClO_3 \rightarrow KCl + O_3$

B. $2KClO_3 \rightarrow 2KCl + 3O_2$

C. $2KClO_3 \rightarrow 2KCl + 2O_3$

D. $2KClO_3 \rightarrow KCl_2 + 2O_2 + KO_2$

53. Which of the following is not a unit of concentration?

A. %w/w.

B. Molality.

C. Molarity.

D. Mole.

54. When the equation given below is balanced, how many moles of water will be produced for each mole of calcium phosphate?

$__ Ca(OH)_{2(aq)} + __H_3PO_{4(aq)} \rightarrow __H_2O_{(g)} + __Ca_3(PO_4)_{2(s)}$

A. 1

B. 2

C. 6

D. 10

55. Which of the following is dependent on temperature?

A. Molality.

B. Molarity.

C. Mole fraction.

D. %w/w.

56. What volume in cm^3 of 0.2 mol dm^{-3} HCl will neutralize 25cm^3 of 0.2 mol dm^{-3} NaOH?

A. 5.0.

B. 12.5.

C. 25.0.

D. 40.0.

57. According to the equation given below, how many molecules of oxygen are produced by the decomposition 43.0 g of potassium chlorate?

$2KClO_3 \rightarrow 2KCl + O_2$

A. 1.06×10^{23}

B. 6.82×10^{23}

C. 12.3×10^{22}

D. 1.46×10^{24}

58. One mole of $(NH_4)_2Cr_2O_7$ contains _____

A. One mole of nitrogen.

B. Four moles of hydrogen.

C. One mole of chromium.

D. Seven moles of oxygen.

59. Which of the following statements are true?

A. 1 mol H atoms = 6.02 x 10^{23} H atoms.

B. The formula mass of O2 = 32.00 amu.

C. 6.02 x 1023 H atoms have a mass of 1.008 g.

D. All of the above are true.

60. Which of the following statements is correct of ΔH, the enthalpy of reaction?

i. It is the heat change accompanying a chemical reaction.

ii. It is negative for exothermic reactions.

iii. It is positive for endothermic reactions.

A. i only.

B. ii and iii only.

C. iii only.

D. i, ii and iii.

TOPIC: STRUCTURE OF THE ATOM

DIRECTION: Choose the correct answer from the lettered options.

1. The number of electrons in the valence shell of an element of atomic number 14 is _____

A. 1.

B. 2.

C. 3.

D. 4.

2. Which of the following has neither mass nor charge?

A. Alpha particle.

B. Deuterium.

C. Gamma rays.

D. Neutron.

3. Pauli's exclusion principle is related to _____

A. quantum numbers of electrons.

B. reversibility of equilibrium reactions.

C. electronegativity values of elements.

D. collision theory of reaction states.

4. What brings about emission of visible and ultraviolet radiation from atoms?

A. Electrons changing from higher to lower energy levels.

B. Electrons changing from lower to higher energy levels.

C. Electrons moving about the atoms within an orbital.

D. The atoms condensing from a gas to a liquid or solid.

5. Which of the following sets of coefficients gives the correct values for the coefficients w, x, y, z in the following equation

$wAl + xFe_3O_4 \rightarrow yAl_2O_3 + zFe$

A. 8 3 4 9.

B. 2 3 2 1.

C. 1 3 2 1.

D. 1 4 3 2.

6. How many sp hybrid bonds can be associated with a central atom?

A. 1.

B. 2.

C. 3.

D. 4.

7. What is the nuclear symbol for the isotope of oxygen which has 9 electrons?

A. $^{16}_{8}O$.

B. $^{17}_{8}O$.

C. $^{18}_{8}O$.

D. $_{18}{}^{9}O$.

8. The mass of an individual electron is of the order of _____.

A. $9.1 \times 10^{-31}g$

B. $6x10^{23}g$

C. 1/2000g

D. $9.1 \times 10^{-31}Kg$

9. $^{14}_{7}N + X \rightarrow {}^{17}_{8}O + {}^{1}_{1}H$

In the above reaction, X is a _____

A. neutron.

B. lithium atom.

C. helium atom.

D. deuterium atom.

10. How many protons, neutrons, and electrons does $^{7}_{4}Be^{2+}$ have?

A. 4, 3, 2.

B. 4, 3, 4.

C. 4, 3, 6.

D. 4, 6, 3.

11. The knowledge of half-life can be used to _____

A. create an element.

B. detect an element.

C. split an element.

D. irradiate an element.

12. Example of an element that can catenate is _____

A. carbon.

B. nitrogen.

C. bromine.

D. chlorine.

13. The following are uses of radioactive isotope except _____.

A. determining equilibrium positions

B. tracing reaction paths

C. dating elements

D. radiography

14. The total number of subatomic particles in $^{31}_{15}P$ is _____

A. 31.

B. 16.

C. 46.

D. 51.

15. Li^{+} has _____ electrons.

A. 0.

B. 1.

C. 2.

D. 3.

16. The energy required to remove the most loosely bound electron from an atom in the gaseous state is known as _____

A. bond energy.

B. ionization energy.

C. potential energy.

D. activation energy.

17. Which of the following denotes an alpha particle?

A. $^{1}_{0}n$.

B. $^{4}_{2}He$

C. $.^{0}_{-1}e$.

D. $^{9}_{4}Be$.

18. Scientists whose experiments gave evidence about the nature and include _____

(I) J.J. Thompson.

(II) Lord Rutherford.

(III) Le¢ Chatelier.

(IV) Robert Boyle.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

19. Identify the hybrid orbital that would contain an electron with the highest energy.

A. sp.

B. sp^2.

C. sp^3.

D. sp^{3d}.

20. When a nuclear change takes place, which is true?

A. Energy is destroyed.

B. Energy is released.

C. Energy is unchanged.

D. Energy does not occur.

E. Energy is variable.

21. To change L^i to Li^+, you need to _____

A. add one electron.

B. remove one proton.

C. remove one electron.

D. add one proton.

22. Which of the following pairs of elements is most likely to form a covalent compound?

A. Sodium and oxygen.

B. Phosphorus and oxygen.

C. Copper and chlorine.

D. Cesium and iodine.

23. $^{235}_{92}U + {}^{1}_{0}n \rightarrow {}^{145}_{56}Ba + {}^{88}_{36}Kr + 3{}^{1}_{0}n$ + energy

The radiation reaction represented by the equation above is _____

A. an alpha particle emission.

B. an endothermic reaction.

C. a thermal ionization.

D. nuclear fission.

24. Two atoms X and Y have electronic configurations shown below;

X: $1s^2 2s^2 2p^6 3s^1$
Y: $1s^2 2s^2 2p^6 3s^2 3p^5$

Which of the following is the best description of the bond formed between the two of them?

A. Covalent, with formula XY.

B. Covalent, with formula XY_2.

C. Ionic, with formula X_2Y.

D. Ionic, with formula XY.

25. In which of the following crystals are the particles held by Van der Waal's forces?

A. Sodium chloride.

B. Ice.

C. Diamond.

D. Iodine.

26. The existence of two or more forms of the same element in the same physical state is known as _____

A. allotropy.

B. resonance.

C. hybridization.

D. isotopy.

27. Cancerous growth are cured by exposure to _____.

A. g- rays.

B. b- rays.

C. a- rays.

D. x- rays.

28. Which of the following sets of coefficients gives the correct values for the coefficients w, x, y, z in the following equation?

w $Cu_{2(aq)}$ + x $I_{(aq)}$ → y $CuI_{(s)}$ + z $I_{2(s)}$

A. 2 4 2 1.

B. 2 2 1 1.

C. 1 1 1 1.

D. 1 4 2 2.

29. Millikan's contribution to the development of atomic theory is the determination of _____.

(I) charge on electron

(II) Charge -to- mass ratio

(III) Positive rays

(IV) Cathode rays

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

30. Which of the following statements is correct?

A. The number of molecules of the gas in X is greater than that in Y.

B. The number of molecules of the gas in X is lower than that in Y.

C. The number of molecules of the gas in X is the same as that in Y.

D. The information given in the question is not sufficient to allow comparison of the number of molecules of the gases in the two cylinders.

31. _____ instrument was used in the discovery of proton.

A. Cathode ray tube

B. Glass tube

C. Discharge tube with central cathode

D. Discharge tube with terminal cathode

32. Weak attractive forces which exists even between discrete molecules are known as _____.

A. van der Waals forces

B. hydrogen forces

C. metallic forces

D. coordinate covalent forces

33. $^{14}_{6}C$ and $^{12}_{6}C$ are examples of carbon _____

A. ions.

B. isotopes.

C. valences.

D. molecules.

34. Which of the following best describes the formation of an ionic bond between atoms of two elements?

A. Sharing pairs of electrons between the atoms.

B. Sharing of valence crystals in the ionic crystal lattice of the compound of the two elements.

C. Transfer of electrons between atoms.

D. Formation of dipole-dipole forces between the atoms.

35. The empirical formula of a hydrocarbon containing 0.12mole of carbon and 0.36mole of hydrogen is _____.

A. CH_2

B. CH_3

C. C_2H_2

D. C2H4

36. Nuclear reactions can be used in the following except _____

A. gauging the thickness of objects.

B. making atomic bombs.

C. traveling to the moon.

D. generating electricity.

37. Which of the following pairs of subatomic particles have essentially the same mass?

A. Neutrons and electrons.

B. Anion and cation.

C. Protons and neutrons.

D. Protons and electrons.

38. What are the values of x and y in the following equation?

$^{234}_{90}Th \rightarrow {}^{y}_{x}Pu$ + b-particle, where b-particle = $^{0}_{1}e$

A. x = 91

y = 234.

B. x = 92

y = 235.

C. x = 89

y = 236.

D. x = 88

y = 238.

39. **Which of the following is true about the information concerning elements 'A' and 'B'?**

Elements	No of protons	No of neutrons	No of electrons
A	23	24	22
B	23	23	23

A. A is cation and B is a neutral atom.

B. They are neutral isotopes of the same element.

C. They are two different elements.

D. They are both ions of the same element.

40. Which of the following provides the best description of an isotope?

A. Atoms with the same number of protons but differing numbers of electrons.

B. Atoms with the same mass number but differing atomic numbers.

C. Atoms with the same mass numbers and the same atomic numbers.

D. Atoms with the same atomic numbers but differing mass numbers.

41. $^{14}_{6}C$ has _____ protons.

A. 6.

B. 14.

C. 12.

D. 10.

42. The emission of an alpha particle during the decay of uranium 238 is an example of a _____ change.

A. chemical

B. physical

C. nuclear

D. atomic

43. An atomic-level species is found to contain 16 protons, 16 neutrons and 18 electrons. This species is best described as _____

A. an atom of sulphur (S).

B. an isotope of sulphur.

C. a cation of sulphur.

D. an anion of sulphur.

44. The greatest weakness of Rutherford's atomic model lies in the fact that his theory _____.

A. looked like the solar system

B. did not explain how an electron moving in an orbit around the nucleus radiates energy and eventually disappears into the nucleus

C. did not make use of quantum theory in the interpretation of the model

D. did not make use of emission spectra in the interpretation of the model

45. When an atom gains an electron, it becomes _____

A. chemically inactive.

B. negatively charged.

C. positively charged.

D. a cation.

46. Fe^{2+} and Fe^{3+} are different iron _____

A. atoms.

B. elements.

C. isotopes.

D. ions.

47. Which of the following pairs of elements would be expected to form an ionic compound when they combine?

A. Sulphur and oxygen.

B. Phosphorus and oxygen.

C. Magnesium and aluminium.

D. Magnesium and sulphur.

48. A radioactive solid is best stored _____

A. under paraffin oil.

B. under ultraviolet light.

C. in a cool, dark cupboard.

D. in a box lined with lead.

49. Li^{+} and Cu^{2+} are examples of _____

A. anions.

B. cations.

C. isotopes.

D. molecules.

50. The following are electromagnetic waves except _____.

A. white light

B. photon

C. x-ray

D. infra-red

51. Which of the following is the most likely formula of a compound formed between 'A' and 'B'?

A. A^2B.

B. AB.

C. A^2B^3.

D. AB^2.

52. The smallest particle of a substance that can exist as an entity of its own and has the chemical and physical characteristics of that substance is _____.

A. an element

B. a molecule

C. an atom

D. a mole

53. Which of the following statements is correct?

A. The dipole-dipole intermolecular forces between NH_3 molecules are stronger than those between PH_3 molecules.

B. The dispersion intermolecular forces between NH_3 molecules are stronger than those between PH_3 molecules

C. The N-H bond in NH_3 is stronger than the P-H bond in PH_3

D. The N-H bond in NH_3 is weaker than the P-H bond in PH_3

54. If the solubility of $KHCO_3$ is 0.40 $moldm^{-3}$ at room temperature, the mass of $KHCO^3$ in100cm^3 of the solution at this temperature is _____.

A. 4.0g.

B. 10.0g.

C. 40.0g.

D. 100.0g.

55. What is emitted during the disintegration of barium nucleus as shown by the equation below?

$^{138}_{56}Ba \rightarrow {}^{134}_{54}Xe$?

A. Alpha particles.

B. Beta particles.

C. Gamma rays.

D. Neutrons.

56. Which of the following describes the region of space in a particular energy level where an electron is most likely to be found?

A. A shell.

B. An electron configuration.

C. An orbit.

D. An orbital.

57. The standard element with which chemists define relative atomic mass is _____

A. carbon-12.

B. carbon-13.

C. hydrogen-3.

D. carbon-14.

58. The mass number of an atom of an element is the sum of it's _____

A. electrons, neutrons and protons.

B. electrons and protons.

C. protons and neutrons.

D. orbital electrons.

59. Given only the atomic number of an element, it is possible to determine the number of _____

(I) protons in it's nucleus.

(II) unpaired electrons present.

(III) electrons in it's outermost shell.

(IV) neutrons in it's nucleus.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

60. Radon is used as a tracer in medical research because it _____

A. is monoatomic.

B. is radioactive.

C. is a noble gas.

D. has a complete valence shell.

61. When a solution contains more of the solute than is present in a saturated solution at that particular temperature it is called a _____ solution.

A. concentrated

B. supersaturated

C. unsaturated

D. colloidal

62. The position of an element in the periodic table is determined by _____

A. it's density.

B. it's atomic radius.

C. it's relative atomic mass.

D. the number of protons in it's atom.

63. The empirical formula of an organic compound is CH2O. Its molar mass is 60.0 g mol-1 What is its molecular formula?

[Atomic mass, g mol-1: C = 12.0; H = 1.0; O = 16.0]

A. CH_2O.

B. $C_2H_4O_2$.

C. $C_3H_6O_3$.

D. $C_4H_8O_4$.

64. Hydrogen is used for the following except _____

A. manufacturing of ammonia.

B. synthesis of hydrochloric acid.

C. extinguishing fire.

D. conversion of coal to petrol.

65. Which of these is the correct formulas for various compounds written by a student?

[I] Copper (I) sulphate – Cu_2SO_4.

[II] Sodium sulphite - Na_2S.

[III] Aluminium phosphate - $AlPO_4$.

[IV] Calcium nitrate - $CaNO_3$.

[V] Sodium chloride - NaCl.

66. What is the symbol for an ion which has 8 protons and 10 electrons?

(I) N^{3-}
(II) O^{2-}
(III) O^{3-}
(IV) F^{-}

A. All are correct formulae

B. Only I, II and III are correct.

C. Only I, III and V are correct

D. Only II and III are correct.

67. Matter is made up of basic building blocks called _____.

A. elements

B. moles

C. states

D. atoms

68. If an atom of an element X is represented as

1s, which of the following deductions are correct?

(I) X is chemically inactive.

(II) An atom of X has two neutrons.

(III) An atom of X has only one shell.

(IV) X belongs to period one of the periodic table.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

69. How many valence electrons (bonding and non-bonding) are present in a molecule of water?

A. 4.

B. 6.

C. 8.

D. 20.

70. In which of the following are radioactive isotopes used?

(I) Scientific research.

(II) Sterilization of equipment.

(III) Dating techniques.

(IV) Treatment of cancer.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

71. Which of the following best describes the molecular property that expresses the ease with which the electron density in a neutral atom can be distorted?

A. Electronegativity.

B. Polarizability.

C. Polarity.

D. Van der Waals force.

72. What is the mass number of an element if its atom contains 10 protons, 10 electrons and 12 neutrons?

A. 32.

B. 22.

C. 20.

D. 10.

73. An isotope of phosphorus (atomic number 15) whose mass number is 32 is used in compounds to treat leukemia. How many neutrons are in this isotope?

A. 32.

B. 15.

C. 17.

D. 16.

74. A compound contains 31.91% of potassium, 28.93% of chlorine and the rest, Oxygen. What is the chemical formula of the compound?

[K = 39, Cl = 35.5, O = 16].

A. $KClO_3$.

B. $KClO_4$.

C. KClO.

D. $KClO_2$.

75. An atom is the smallest part of _____.

A. a substance.

B. a compound.

C. an element.

D. a lattice.

76. The basic particles from which matter could be formed include the following except _____

A. molecules.

B. atom.

C. ion.

D. all of the above.

77. A solid has a melting point of 1440°C. The solid conducts electricity. It does not dissolve in water or non-polar solvents. Which of the following describes the bonding between the atoms in the solid?

A. Both covalent and dipole-dipole.

B. Ionic.

C. Covalent.

D. Metallic.

78. In which of the following substances would you expect the bonding to be most ionic?

A. hydrogen chloride gas

B. ice

C. solid lead bromide

D. diamond

79. Which of the following gives the types of orbitals found in period 3 of the periodic table?

A. s orbitals only.

B. s and p orbitals.

C. s, p and d orbitals.

D. s, p and f orbitals.

80. Which type of radiation is unaffected by magnetism?

A. Alpha.

B. Beta.

C. Gamma.

D. Helium.

81. N^{3-} has _____

A. 7 protons and 4 electrons.

B. 7 protons and 10 electrons.

C. 7 protons and 11 electrons.

D. 8 protons and 11 electrons.

82. Find X in the given equation: 146C → X + b

A. $^{13}_{6}C$.

B. $^{14}_{7}N$.

C. $^{12}_{5}B$.

D. $^{12}_{6}C$.

83. Which of the following cannot be deduced from the electronic configuration of a transition metal?

A. Possession of magnetic properties.

B. Ability to form complex ions.

C. Position in the periodic table.

D. Variable oxidation states.

84. _____ atomic particle was discovered as a result of the bombardment of beryllium sheet using alpha particle.

A. Neutron

B. Positron

C. Proton

D. Electron

TOPIC: WATER. SOLUTIONS. SOLUBILITY

DIRECTION: Choose the correct answer from the lettered options.

1. When sols solidify under certain conditions _____ is formed.

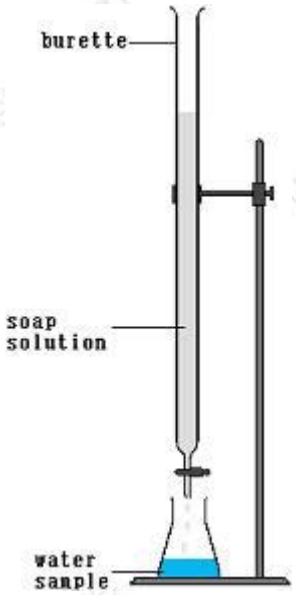
A. aerosols

B. emulsion

C. gels

D. none of the above

2. The diagram drawn is an experiment to _____



A. treat water.

B. find out that hydrogen burns in air.

C. demonstrate tyndall effect.

D. compare hardness of various samples of water.

3. A common solvent of sulphur is _____

A. water.

B. carbon (iv) sulphide.

C. alcohol.

D. ethanoic acid.

4. Fluoride ions are sometimes added in the treatment of town water supply in order to _____

A. improve coagulation.

B. kill germs and bacteria.

C. make the water tasteful.

D. prevent tooth decay.

5. Solute is to true solution as _____ is to colloids.

A. dispersion medium

B. dispersion phase

C. crystalloids

D. aerosols

6. The loss of molecules of water of crystallization to the atmosphere by some crystalline salts is known as _____

A. efflorescence.

B. effervescence.

C. phosphorescence.

D. fluorescence.

7. _____ of a solute is the number of moles of solute required to form a saturated solution in 1dm3 of the solvent at a particular temperature and in the presence of undissolved solute.

A. Solution

B. Saturated solution

C. Supersaturated solution

D. Solubility

8. Substances which dissolves endothermically would be _____

A. less soluble at higher temperatures.

B. more soluble at lower temperatures.

C. more soluble at higher temperatures.

D. less soluble at lower temperatures.

9. Dehydration of a substance is best described as _____

A. the removal of moisture.

B. the addition of water.

C. the addition of moisture.

D. the removal of the elements of water.

10. When a crystal was added to it's solution, it did not dissolve and the solution remained unchanged showing that the solution was _____

A. concentrated.

B. saturated.

C. unsaturated.

D. colloidal.

11. Solubility varies with _____

A. pressure.

B. volume of solvent.

C. temperature.

D. volume of solute.

12. The solubility of alcohols in water is due to _____

A. their covalent nature.

B. hydrogen bonding.

C. their low boiling point.

D. their ionic character.

13. To test for water, _____ and _____ are added to water.

A. anhydrous copper [II] trioxocarbonate [IV] and cobalt [II] chloride.

B. anhydrous copper [II] tetraoxosulphate [VI] and cobalt [II] chloride.

C. hydrated copper [II] tetraoxosulphate [VI] and cobalt [II] oxide.

D. hydrated copper [II] trioxocarbonate [IV] and cobalt [II] oxide.

14. A freshly boiled starch is a typical example of _____

A. an aerosol.

B. an emulsion.

C. a sol.

D. a solution.

15. _____ is one which can dissolve more solute at a given temperature.

A. Suspension

B. Saturated solution

C. Supersaturated solution

D. Unsaturated solution

16. Temporary hardness of water is removed by the use of the following except _____

A. Boiling.

B. Use of $Ca(OH)_{2.}$

C. Use of $Na_2CO_{3.}$

D. Use of alum.

17. Potassium trioxocarbonate [IV] was saturated out of a solution of mass 63.28g. Find the concentration in moles per dm^3 of the solute of mass 12.30g.

[k = 39, C = 12, O = 16, volume of water = 1000cm3].

A. 1.41mol/dm^3.

B. 1.14mol/dm^3.

C. 1.57mol/dm^3.

D. 1.75mol/dm^3.

18 Coffee stains are removed with _____

A. turpentine.

B. ammonia.

C. borax in water.

D. petrol.

19. A true solution is _____

A. when a solute dissolves in a solvent and their particles are homogeneous.

B. when a solute dissolves in a solvent and their particles are heterogeneous.

C. when a solute dissolves in a solvent and their particles settle at the bottom of a container.

D. none of the above.

20. Distilled water is different from deionized water because _____

A. distilled water is a product of condensed steam while deionized water filtered laboratory water.

B. distilled water is always pure and sold in packs while deionized water not packed for consumption.

C. distilled water is a condensed steam but deionized water is produced using exchange resins which absorb undesired ions.

D. distilled water is man-made while deionized water is both natural and artificial.

21. Which of the following cannot be used to soften permanently hard water?

A. Calcium hydroxide.

B. Distillation.

C. Sodium carbonate.

D. An ion exchange resin.

22. The concentration of a saturated solution varies with the following except _____

A. volume.

B. solute.

C. solvent.

D. temperature.

23. A saturated solution is a solution _____

A. in which the solute is in equilibrium with the solvent.

B. in which the solute saturated the solution.

C. the solvent can still accept more solute except when the temperature is lowered.

D. whose solvent has low solubility at a given temperature.

24. When liquid particles are dispersed in a solid medium it is called _____

A. gels.

B. emulsions.

C. aerosols.

D. sols.

25. A graph of solubility against temperature is called _____

A. sigmoid curve.

B. supernant curve.

C. solubility curve.

D. dispersion curve.

26. If 12.2g of lead [II] tetraoxosulphate [VI] were dissolved in 21g of distilled water at 20oC, calculate the solubility of the solute in mol dm^{-3}.

[Pb = 207, S = 32, O = 16, Volume of water = 1000cm^3].

A. 1.92mols/dm^3.

B. 19.2mols/dm^3.

C. 2.02mols/dm^3.

D. 20.2mols/dm^3.

27. Solubility decreases with _____

A. an increase in temperature.

B. a decrease in the volume of solute.

C. a decrease in the temperature.

D. an increase in the volume of solute.

28. Substances which dissolves exothermically would be _____

A. more soluble at lower temperatures.

B. more soluble at higher temperatures.

C. less soluble at lower temperatures.

D. less soluble at higher temperatures.

29. The following are physical properties of water except _____

A. turns to ice when cooled below 0oC.

B. high boiling point.

C. solid water contracts when heated.

D. solid water is less dense than liquid water.

30. When water reacts chemically with a compound to form at least two products the reaction is called _____

A. hydration.

B. dehydration.

C. hydrolysis.

D. drying.

31. The following are characteristics of colloids except _____

A. Tyndall effect on light beam.

B. solid phase are removed by dialysis.

C. colloidal particles are larger than that of suspensions.

D. colloidal particles are separated using parchment membranes.

32. Hard water contains a number of dissolved salts which include _____

A. sodium tetraoxosulphate [VI], magnesium tetraoxosulphate [VI] and calcium hydrogentrioxocarbonate [IV].

B. calcium trioxocarbonate [IV], magnesium tetraoxosulphate [VI] and calcium tetraoxosulphate [VI].

C. calcium tetraoxosulphate[VI], magnesium trioxocarbonate [IV] and calcium hydrogentrioxocarbonate [IV].

D. calcium tetraoxosulphate [VI], magnesium tetraoxosulphate [VI] and calcium hydrogentrioxocarbonate [IV].

33. Treated town water undergoes the following steps except _____

A. coagulation.

B. sedimentation.

C. precipitation.

D. chlorination.

34. Which of the following methods removes temporary hardness of water?

[i] boiling and slaked lime.

[ii] washing soda and slaked lime.

[iii] zeolite and caustic soda.

[iv] washing soda and caustic soda.

A. [i] & [iii].

B. [i] only.

C. [ii] & [iv].

D. [i], [ii], [iii] & [iv].

35. Tyndall effect is when _____

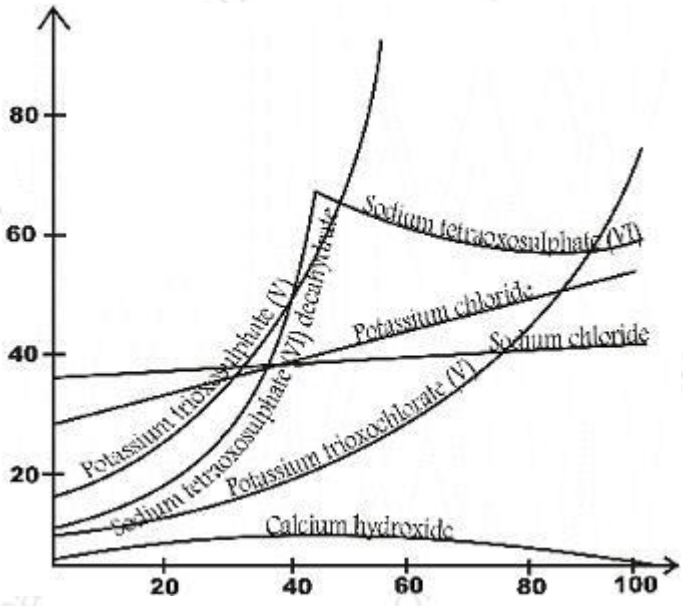
A. solutes are dialyzed in solution.

B. solutes do not scatter light rays.

C. solutes can scatter light rays.

D. none of the above.

36. The diagram drawn shows solubilities of different solutes, the solubility of solute that increases with an increase in temperature is _____



A. potassium chloride.

B. sodium chloride.

C. calcium hydroxide.

D. potassium trioxonitrate [v].

37. When water combines with a substance to form one product only in such a way that water molecules remain intact but bonded to the product the substance is said to be _____

A. dried.

B. hydrated.

C. dehydrated.

D. hydrolyzed.

38. Which of the following are characteristics of true solution?

[i] The solutes can pass through a filter paper.

[ii] The solution can be dialyzed.

[iii] The solutes can scatter light rays.

[iv] The solutes do not scatter light rays.

A. [i], [ii], [iv].

B. [i], [ii], [iii].

C. [i], [ii], [iii], [iv]

D. [ii], [iii], [iv].

39. Which of the following is not true about the hydrated and anhydrous forms of copper [ii] sulphate?

A. One is blue and the other is colourless [white].

B. One is dry and the other is wet.

C. One is crystalline and the other is powdered.

D. They have different formula masses.

40. Which is the odd one out?

A. HCl.

B. NH_3.

C. NO_2.

D. CO.

41. Which of the following options are properties of water except?

A. It boils at 100°C and melts at 0°C.

B. It is more dense than ice.

C. It is a non-polar universal solvent.

D. It is neutral to litmus.

42. Water is temporarily hard because it contains _____

A. $CaSO_4$.

B. $MgSO_4$.

C. Chorine.

D. $Ca(HCO_3)_2$.

43. Which of the following factors would not affect the solubility of a gas?

A. Concentration.

B. Nature of solvent..

C. Pressure.

D. Temperature.

44. A colloidal solutions is _____

A. when a solute dissolves in a solvent and the particles of solute are smaller than the solvent particles and the particles are heterogeneous.

B. when a solute dissolves in a solvent and the particles of the solute are larger than the solvent particles and the particles are homogeneous.

C. when a solute dissolves in a solvent and the particles of the solute are smaller than the solvent particles and the particles are homogeneous.

D. when a solute dissolves in a solvent and the particles of the solute are larger than the solvent particles and the particles are heterogeneous.

45. On which of the following is the solubility of a gaseous substance dependent?

a. Nature of solvent.
b. Nature of solute.
c. Temperature.
d. Pressure.

A. A, B, C and D.

B. A and B.

C. B.

D. A, B and C.

46. One of these is not a water pollutant.

A. Petroleum.

B. Domestic liquid and solid water.

C. Industrial effluents.

D. Biodegradable chemicals.

47. When solid particles are dispersed in liquid medium it is called _____

A. sols.

B. gels.

C. aerosols.

D. emulsion.

48. Which of the following methods are purification of rain water?

[i] coagulation, sedimentation.

[ii] filtration, disinfection.

[iii] boiling.

A. [i] & [ii].

B. [i] only.

C. [iii] only.

D. [ii] only.

49. The following options are disadvantages of hard water except _____

A. it prevents lather of soap when washing.

B. it causes furring of kettles and boilers.

C. it has tastes because of the dissolved minerals in it.

D. it cannot be used in dyeing and tanning.

50. A solution which contains more solute in solution than the maximum amount it can dissolve at that temperature is called _____

A. supersaturated solution.

B. saturated solution.

C. solubility.

D. suspension.

ANSWERS

TOPIC: ACIDS. BASES. SALTS

DIRECTION: Choose the correct answer from the lettered options.

1. Which of the following oxides is basic?

A. NO_2.

B. Al_2O_3.

C. SO_2.

D. CaO.

The correct answer is option [D].

2. Which is the correct arrangement of the following compounds iaccording to increasing acidic strength?

A. H_2SO_4 > HCl > HBr > HI.

B. H2SO4 < HCl < HBr < HI.

C. HCl >H_2SO_4 > HBr > HI.

D. HI < HBr > HCl <H_2SO_4

The correct answer is option [B].

Reason: HI is the strongest acid.

3. Which of the following compounds is a base?

A. CO_2.

B. CaO.

C. H_3PO_3.

D. CH_3COOCH.

The correct answer is option [B].

A base is a substance which neutralizes an acid to form a salt and water

4. The following except _____ are the different types of salts.

A. normal salt, acid salt, basic salt, complex salt and double salt

B. normal salt, double salt and acid salt

C. complex salt, basic salt, acid salt and hydrolyzed salt

D. double salt, basic salt and complex salt

The correct answer is option [C].

5. Which of the following are characteristic properties of acids?

(I) They form oxonium ions in water.

(II) They liberate carbon (IV) oxide from trioxocarbonate (IV) salts.

(III) They turn blue litmus red.

(IV)They have a soapy feel.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [C].

6. An alkali is _____

A. a basic hydroxide.

B. an acid hydroxide.

C. an hydrated basic hydroxide.

D. an aqueous solute.

The correct answer is option [C].

An alkali is a base that has been dissolved in water and any substance containing water is called a hydrate.

7. An acid is a substance, which produces water in the presence of _____

A. salts.

B. oxygen.

C. effervescence.

D. hydroxonium ions.

The correct answer is option [D].

Hydroxonium ion is formed when an hydrogen ion reacts with water

H+ + H2O → H3O+

8. A chemical used to determine whether a substance is an acid or a base is called _____.

A. an indicator

B. water

C. a salt

D. an alkaline

The correct answer is option [A].

9. The pH of a solution is _____

A. log [H^+].

B. log [$-H^-$].

C. -log [H^+].

D. -log [H].

The correct answer is option [C].

10. Which of the following compounds will form a solution when exposed to air?

A. $CaCl_2$.

B. $CuSO_4$.

C. $Na_2CO_3.10H_2O$.

D. $NaNO_3$.

The correct answer is option [B].

11. Which of these salts is not an acid salt?

A. $NaHCO_3$.

B. HCOONa.

C. Na_2HPO_4.

D.

The correct answer is option [B].

12. The anhydride of tetraoxosulphate (VI) acid is _____

A. sulphur (IV) oxide.

B. sulphur (VI) oxide.

C. hydrogen sulphide.

D. trioxosulphurate (IV) acid.

The correct answer is option [B].

8.52g of magnesium tetraoxosulphate [vi]- heptahydrate [MgSO4.7H2O] were heated in a crucible to a constant mass, first at a temperature of 130oC. The residue that was obtained at 130oC weighs 5.31g.

13. Calculate the water lost during heating.

[Mg = 24, H = 1, O = 16, S = 32]

A. 5.

B. 3.

C. 4.

D. 2.

The correct answer is option [B].

Solution: Using the either of the equations $^{\text{Mass of anhydrous}}/_{\text{Mass of residue}} = {}^{\text{Molar mass of water}}/_{\text{Molar mass of anhydrous}}$ OR $^{\text{Mass of anhydrous}}/_{\text{Mass of hydrate}} = {}^{\text{Molar mass of water}}/_{\text{Molar mass of hydrate}}$; where mass of anhydrous = 8.52 - 5.31 = 3.21g; mass of residue = 5.31g; mass of hydrate = 8.52g; molar mass of water of crystallization = H^2O = [1 x 2]X + 16 = 2 + 16 = 18X; molar mass of anhydrous {$MgSO_4$] = 24 + 32 + [16 x 4] = 24 + 32 + 64 = 120g/mol; molar mass of hydrate = 120 + 18X → $^{3.21}/_{5.31} = {}^{18X}/_{120}$ OR $^{3.21}/_{8.52} = {}^{18X}/_{120 + 18X}$. Therefore X = $^{0.60451977 \text{ x } 120}/_{18}$ OR $^{45.204672}/_{11.2192992}$ = 4.03 ≈ 4. Therefore the amount of water lost = Amount of water in hydrated crystal - Amount of water left in the hydrated crystal = 7 - 4 = 3.

14. All common gases are dried using P_2O_5 except _____

A. NO_2.

B. NH_3.

C. SO_2.

D. $H2_S$.

The correct answer is option [B].

Reason: P2O5 is a drying agent for all gases except ammonia [NH3].

15. The sum of the pH and pOH concentration of a solution is _____

A. 7.

B. 0.

C. 12.

D. 14.

The correct answer is option [D].

16. The phenomenon whereby substances absorb large amount of water on exposure to the atmosphere is _____

A. deliquescence.

B. hygroscopy.

C. efflorecence.

D. drying agent.

The correct answer is option [B].

Reason: Hygroscopy is a phenomenon whereby substances absorb large amount of water on exposure to the atmosphere without forming a solution.

17. The term used for describing a substance that is capable of reacting either as an acid or as a base is _____

A. amphoterism.

B. isomerism.

C. polyprotic.

D. none of the above.

The correct answer is option [A].

Substances that act as a base and as an acid are called amphoteric substances.

18. Basicity of an acid is _____

A. the number of replaceable oxygen ions, $O2^{-}$ in one molecule of the acid.

B. the number of removable hydrogen ions, H^{+},in one molecule of the acid.

C. the number of replaceable hydrogen ions, H^{+}, in one atom of the acid.

D. the number of replaceable hydrogen ions, H^{+}, in o+=ne molecule of the acid.

The correct answer is option [D].

19. Which of the following option is not an acid-base indicator?

A. Litmus paper.

B. Phenolphthalein

C. Methane orange.

D. Methyl orange.

The correct answer is option [C].

20. A solution whose pH cannot be easily altered due to accidental addition of acid or base is called _____

A. plasma.

B. annotated solution.

C. buffer solution.

D. deionized water.

The correct answer is option [C].

Reason: Buffer solution is one which resists changes in pH on dilution or on addition of small amounts of acids or alkalis.

21. Acids can be prepared by the following methods listed except _____

A. dissolving an acid anhydride in water.

B. combination of constituent elements.

C. double decomposition.

D. using a volatile acid from its salts.

The correct answer is option [C].

Reason: Double decomposition is used to prepare insoluble salts.

22. Which of the following options are general methods of preparing salts?

(I) Neutralization

(II) Precipitation

(III) Double decomposition

(IV) Action of an acid on a metal

A. I & II

B. III & IV

C. I, II & III

D. I, II, III & IV

The correct answer is option [D].

23. The following substances are all normal salts with the exception of _____

A. $Al(NO_3)_3$.

B. $FeSO_4$.

C. $Mg(OH)NO_3$.

D. NaCl.

The correct answer is option [C].

24. A solution of pH 7 is _____

A. acidic.

B. neutral.

C. concentrated.

D. dilute.

The correct answer is option [B].

It is neither acidic nor alkaline

If the pH is lesser than 7 then the solution is Acidic. And if pH is greater than 7 then the solution is B

25. The following pairs of solutions are mixed. Which mixtures produce a precipitate?

A. Calcium chloride and Potassium trioxocarbonate [IV].

B. Sodium hydroxide and Hydrochloric acid.

C. Potassium hydroxide and Trioxonitrate [V] acid.

D. Silver trioxonitrate [V] and Hydrochloric acid.

The correct answer is option [D].

When Silver nitrate reacts with an acid [hydrochloric acid] a precipitate of silver chloride is formed.

26. When a metallic oxide reacts with both acids and bases, the oxide is said to be _____

A. acidic.

B. amphoteric.

C. basic.

D. complex.

The correct answer is option [B].

27. A salt derived from a strong base and a weak acid will undergo hydrolysis and give a solution which will be _____

A. acidic.

B. basic.

C. neutral.

D. viscous.

The correct answer is option [B].

28. Acid anhydride is the same as _____

A. dry acid.

B. acid that increase its volume when exposed to air.

C. acid made by drying the reactants first.

D. acid made from oxides of non-metals.

The correct answer is option [D].

29. A 500 mL solution of pH 1 is mixed with the same volume of water. Which of the following best describes the resulting mixture?

A. acidic

B. alkaline

C. basic

D. neutral

The correct answer is option [A].

30. The theory which states that an acid is defined as a substance that produces hydrogen ion in an aqueous medium and that a base is a substance that produces hydroxyl ion in an aqueous medium is _____

A. Arrhenius law.

B. Arrhenius theory.

C. Bronsted-Lowry theory.

D. Bronsted-Lowry law.

The correct answer is option [B].

31. Consider the neutralization reaction represented by the following equation;

$Na_2CO_3 + 2HNO_3$

→ $2NaNO_3$

+ H_2O + CO2

the stoichiometric ratio of acid to base is _____

A. 2:2.

B. 2:1.

C. 1:2.

D. 1:1.

The correct answer is option [B].

32. A substance formed when the hydrogen of an acid is partly or completely replaced by a metal or by the ammonium ion is _____

A. salt.

B. alkali.

C. base.

D. acid.

The correct answer is option [A].

33. Alums are classified as _____

A. simple salts.

B. acid salts.

C. anhydrous salts.

D. double salts.

The correct answer is option [D].

A good example of Alum is Potsh Alum → KAl(SO4)2.12H2O (Potassium Tetraoxosulphate (VI) dodecahydrate)

34. _____ of an acid is the number of replaceable hydrogen ions in one molecule of an acid.

A. Acidity.

B. Alkalinity.

C. Anhydride.

D. Basicity.

The correct answer is option [D].

35. Which of the following is a general method of preparing acids?

A. Direct combination of constituent elements.

B. Double decomposition involving a salt solution.

C. Reaction between an anhydride and water.

D. Reaction between a base and an amphoteric oxide.

The correct answer is option [A].

$H_{2(g)}$ + $Cl_{2(g)}$ activated charcoal → 2HClg

36. Find the hydroxide ion concentration in 0.03M tetraoxophosphate [v] H3PO4 acid solution.

A. 1.11 x 10-13mol/$dm^{3.}$

B. 1.11 x 10-12mol/$dm^{3.}$

C. 1.11 x 10-2mol/$dm^{3.}$

D. 1.11 x 10-14mol/$dm^{3.}$

The correct answer is option [A].

Solution: $H_3PO_4 \rightarrow 3H^+ + PO^{3-}$
$H^+ = 0.03 = 3 \times 10^{-2}$
$3H^+ = 3[3 \times 10^{-2}] = 9 \times 10^{-2}$
$9 \times 10^{-2} \times [OH^-] = 1 \times 10^{-14}$
$\rightarrow OH^- = {}^{1 \times 10-14}/_{9 \times 10^{-2}} = 1.11 \times 10^{-13} mol/dm^3$.

37. The Bronsted-Lowry theory states that an acid as _____

A. a chemical species that is able to lose or donate a proton.

B. a chemical species that is able to gain or accept a proton

C. a molecule or ion that is capable of accepting an electron

D. a conjugate base.

The correct answer is option [A].

The Bronsted-Lowry theory states that an acid is a chemical species (molecule or ion) that can donate or lose a proton or hydrogen ion.

38. A strong dilute H_2SO_4 ionizes _____

A. slowly but contains more water than acid.

B. fast but contains more water than acid.

C. fast but contains more acid than water.

D. slowly but contains more acid than water.

The correct answer is option [B].

39. Which of the following acids can function both as a drying agent and as a dehydrating agent?

(I) Fuming HNO_3.

(II) Glycol CH_3COOH.

(III) Concentrated HCl.

(IV) Concentrated H_2SO_4.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [B].

40. Sodium hydroxide is added drop by drop to some hydrochloric acid in a beaker. Which of the following occurs in the beaker?

A. The pH of the hydrochloric acid decreases.

B. The concentration of hydrogen ions increases.

C. The concentration of hydroxide ions increases.

D. The solution turns pink.

The correct answer is option [A].

41. Which of the following statements is correct?

A. OH^- is the conjugate base of H_3O^+.

B. $O2^-$ is the conjugate base of OH^-.

C. H_3O^+ is the conjugate base of H_2O .

D. HO_2 is the conjugate base of H_2O_2 .

The correct answer is option [B].

42. $NaCl(s) + H_2SO_4(l) \rightarrow HCl(g) + NaHSO_4(s)$.

In the reaction given above, H2SO4 behaves as _____

A. a strong acid.

B. an oxidizing agent.

C. a good solvent.

D. a dehydrating agent.

The correct answer is option [B].

43. What is common to both hydrochloric acid and trioxonitrate [V] acid?

A. Both are used for fountain experiment.

B. Both are monobasic.

C. Both are used to prepare hydrogen from zinc granules.

D. Both attack rubber.

The correct answer is option [B].

44. An oxonium ion is _____

A. H_3O.

B. H_3O^+.

C. H_3O^-.

D. 3[H^+ OH^-].

The correct answer is option [B].

45. Soluble salts can be prepared by _____.

[i] Action of dilute acid on a metal

[ii] Action of a dilute acid on an insoluble base

[iii] Action of a dilute acid on a trioxocarbonate [iv]

[iv] neutralization of an alkali by an acid

A. [i], [ii] and [iii].

B. [ii] and [iv].

C. [i], [ii], [iii] and [iv].

D. [ii], [iii] and [iv].

The correct answer is option [C].

46. Which pH value indicates a basic solution?

A. -1.

B. 3.

C. 9.

D. 7.

The correct answer is option [C].

47. How would you prove that sodium hydroxide is a base?

A. Direct touch.

B. Adding water.

C. Reaction with ammonium salts.

D. Reaction with carbon [iv] oxide.

The correct answer is option [C].

Sodium hydroxide reacts with ammonium salts to give ammonia gas. This is the test for all alkalis without using litmus paper.

48. A substance that absorb a large amount of water on exposure to the atmosphere and forms a solution is _____

A. hygroscopic.

B. efflorescent.

C. deliquescent.

D. drying agent.

The correct answer is option [C].

49. Which of the following is not a natural sources of organic acid?

[i] Lactic acid → Milk.

[ii] Ascorbic acid → Oranges.

[iii] Amino acid → Vinegar.

[iv] Citric acid → Lime/Lemon.

A. [i] only.

B. [i] and [iv] only.

C. [iii] only.

D. [iv] only.

The correct answer is option [C].

Amino acid → Proteins.

50. All of the following acids are monobasic except _____

A. hydrochloric acid.

B. tetraoxosulphate [VI] acid.

C. hydrochloric acid.

D. trioxonitrate [V] acid.

The correct answer is option [B].

Reason: The basicity of tetraoxosulphate [VI] as written in the formula → H_2SO_4 is 2 and monobasic means the basicity of the acid is 1. Therefore, H_2SO_4 is not a monobasic acid.

51. A salt which loses mass when exposed to air is _____.

A. hydroscopic

B. deliquescent

C. efflorescent

D. fluorescent

The correct answer is option [C].

Efflorescent compounds lose their water of crystallization to the surroundings.

Hydroscopic and deliquescent compounds absorb moisture from their surroundings.

52. Which of the following are physical properties of an acid?

[i] It will have a sour taste.

[ii] An acid ionizes in solution to produce H^+ ions.

[iii] It is corrosive to the skin.

[iv] It changes the colour of wet litmus paper from red to blue.

A. [i] and [iv].

B. [i], [ii] and [iv].

C. [i], [ii], [iii] and [iv].

D. [i], [ii] and [iii].

The correct answer is option [D].

Acid changes wet litmus paper from blue to red.

53. The concentration of H+ is 6.20 x 10-5. What is the pOH of each solution?

A. 4.21.

B. 5.00.

C. 9.79.

D. 7.99.

The correct answer is option [C].

Solution: [H+] = 6.20 x 10-5

pH = -log [6.20 x 10-5] = 4.21

Note: pH + pOH = 14 → pOH = 14 - pH = 14 - 4.21 = 9.79.

54. Which of the following correctly defines an acid according to the Brønsted-Lowrey theory?

A. It accepts H^+ ions in water.

B. It forms H^+ ions in water.

C. It is a H^+ acceptor.

D. It is a H^+ donor.

The correct answer is option [D].

55. The complex salt formed when aluminium dissolves in sodium hydroxide solution is _____

A. Na_3 $Al(OH)_4$.

B. Na_2 $Al(OH)_3$.

C. Na $Al(OH)_3$.

D. Na $Al(OH)_4$.

The correct answer is option [D].

56. The following options are examples of weak acid except _____

A. H_2CO_3.

B. HCl.

C. CH_3COOH.

D. H_3PO_4.

The correct answer is option [B].

HCl is a strong acid.

57. _____ is not a type of salt.

A. Acids salt

B. Complex salt

C. Organic salt

D. Basic salt

The correct answer is option [C].

58. The pH of a 0.001M acid is _____

A. 2.

B. 3.

C. 4.

D. 1.

The correct answer is option [B].

Solution: Write in standard form 1 x 10-3; pH = -log [H+] = - log 1 x 10-3 = -[-3] = 3.

59. A weak acid is one which _____.

A. is not corrosive

B. is slightly ionized in water

C. does not produce salts with alkalis

D. does not conduct an electric current in aqueous solution

The correct answer is option [B].

60. A combination of hydrogen ions, H+ and hydroxide ions, OH−, to form water molecules and a salt is called _____

A. reaction.

B. neutralization.

C. Arrhenius theory.

D. Brønsted-Lowry theory.

The correct answer is option [B].

61. $H^{+}(aq) + OH^{-}(aq) \rightarrow H_2O(l)$. The equation represents _____

A. hydrolysis.

B. hydration.

C. neutralization.

D. electron affinity.

The correct answer is option [C].

$H^{+}(aq)$ from an acid reacts with $OH^{-}(aq)$ form a base to form water [$H_2O(L)$].

62. Which of the following are physical properties of alkalis?

[i] Alkalis have a bitter taste.

[ii] Alkalis are soapy to the touch.

[iii] Alkalis turn red litmus blue.

[iv] Concentrated forms of the two caustic alkalis, sodium hydroxide and potassium hydroxide, are corrosive.

A. [i] and [ii].

B. [i], [ii], [iii].

C. [i], [ii], [iii], [iv].

D. [i], [ii], [iv].

The correct answer is option [C].

63. Which of these is not recovered through dry heating [evaporation]?

A. NaCl.

B. NH_4NO_3.

C. $CuHSO_4$.

D. $NaHCO_3$.

The correct answer is option [B].

NH_4NO_3 decomposes on heating.

64. A salt which loses mass when exposed to air is _____

A. deliquescent.

B. effervescent.

C. efflorescent.

D. flourescent.

The correct answer is option [C].

65. A substance which produces hydrogen ions [or protons] as the only positive ion when dissolved in water is called _____

A. a base.

B. a salt.

C. an acid.

D. an alkali.

The correct answer is option [C].

66. Which of the following substances is not a salt?

A. Sodium hydrogentrioxosulphate [IV].

B. Lead [ii] trioxonitrate [V].

C. Basic Zinc Chloride.

D. Aluminium oxide.

The correct answer is option [D].

Reason: Aluminium oxide is an amphoteric oxide acting either as an acid or base.

67. Which of the following salts is most conveniently prepared by neutralisation method?

A. $CuSO_4$.

B. $MgCl_2$.

C. $Na2SO_4$.

D. $PbBr_2$.

The correct answer is option [C].

68. Which of the following option is an amphoteric compound?

A. $Ca[OH]_2$.

B. $Fe[OH]_2$.

C. $Al[OH]_2$.

D. KOH.

The correct answer is option [C].

69. Which of the following is the strongest Bronsted base?

A. CH4

B. NH3

C. H2O

D. HF

The correct answer is option [B].

Ammonia is the strongest base in the group. It has a non-bonded pair of electrons and has the lowest electronegativity in the group of compounds that has non-bonded electron pair.

TOPIC: AIR POLLUTION

DIRECTION: Choose the correct answer from the lettered options.

1. Which of the following statements correctly gives evidence that air is a mixture?

(i) The constituents of air can be separated by physical methods.

(ii) The constituents of air still retain their individual properties.

(iii) If the different constituents of air are mixed together, there will be no evidence of any chemical combination such as heat production or volume change

(iv) The composition of air cannot be represented by chemical formula as in the case of a compound.

A. (i), (iii) and (iv).

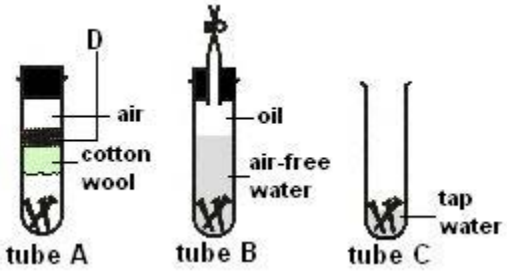
B. (i), (ii), (iii) and (iv).

C. (ii), (iii) and (iv).

D. (i), (ii) and (iii).

The correct answer is option [B].

2. From the diagram drawn, the part labelled D is _____



A. fused calcium oxide.

B. anhydrous calcium chloride.

C. anhydrous calcium tetraoxosulphate (VI).

D. fused calcium hydroxide.

The correct answer is option [B].

3. All these are the causes of luminousity in flames except _____

A. solid particles.

B. solid particles and increased temperature.

C. solid particles and increased pressure.

D. size of materials burnt.

The correct answer is option [D].

4. The phenomenon whereby the flame enters the tube to consume any oncoming fuel as a result of the air-hole at the base of the burner tube is widely opened or the fuel supply is slowly turned down is known as _____

A. striking-back.

B. feedback.

C. suction.

D. none of the above.

The correct answer is option [A].

5. Which of the pollutants causes acid rain?

A. oxides of carbon and oxides of sulphur.

B. oxides of sulphur.

C. oxides of nitrogen and oxides of carbon.

D. oxides of nitrogen and oxides of sulphur.

The correct answer is option [D].

6. What causes luminosity in a flame?

A. Presence of excess oxygen.

B. Presence of limited oxygen.

C. Presence of solid particles.

D. None of the above.

The correct answer is option [C].

7. What chemical process is represented by the following equation?

$4Fe_{(s)} + 3O_{2(g)} + 2xH_2O_{(l)} \rightarrow 2Fe_2O_3.\ xH_2O_{(s)}$

A. Combustion.

B. Oxidation.

C. Hydration.

D. Rusting.

The correct answer is option [D].

8. Which of these is not necessary for metallic corrosion?

A. Water.

B. Oxygen.

C. Heat.

D. Sulphur [IV] oxide.

The correct answer is option [D].

9. Which oxides of carbon allows an increase in infra red ray in the atmosphere?

A. CO.

B. $CO3^{-2.}$

C. CO2.

D. all of the above.

The correct answer is option [C].

10. Which element present in the atmosphere slows down combustion and corrosion?

A. Carbon (IV) oxide.

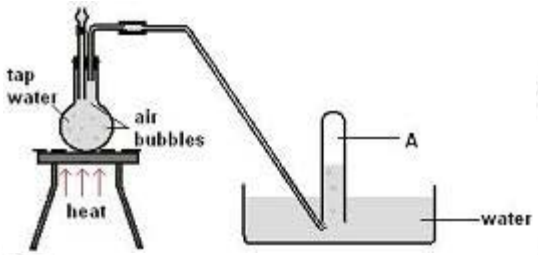
B. Nitrogen

C. Xenon.

D. Oxygen

The correct answer is option [B].

11. The part labelled A in the diagram drawn is _____



A. CO.

B. CO_2.

C. air.

D. H_2.

The correct answer is option [C].

12. Which of the following is a zone identified by a candle flame?

(i) The zone of unburnt gas around the wick.

(ii) The bright yellow luminous zone.

(iii) The barely visible, non-luminous zone.

(iv) The violet zone at the base of the flame a region of incomplete combustion.

A. (i), (ii) and (iii).

B. (ii), (iii) and (iv).

C. (i), (iii) and (iv).

D. (i) and (iv).

The correct answer is option [A].

13. _____ burns with a very faint non-luminous flame.

A. Oxygen

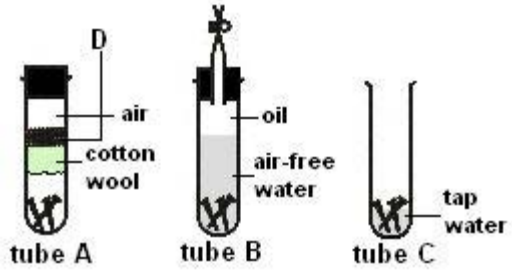
B. Hydrogen

C. Chlorine

D. Candle

The correct answer is option [B].

14. From the diagram drawn, tube B contains _____



A. water alone.

B. air alone.

C. air and water.

D. oil alone.

The correct answer is option [A].

15. Carbon (IV) oxide is released into the atmosphere via _____

A. photosynthesis.

B. carbonation.

C. absorption.

D. respiration.

The correct answer is option [D].

16. The main air pollutants include the following option except _____

A. oxides of carbon.

B. oxides of sulphur and nitrogen.

C. particulate matter.

D. oxides of hydrogen.

The correct answer is option [D].

17. Which of the following options best produces a luminous Bunsen flame?

A. The air-hole at the base of the burner tube should be opened.

B. The air-hole at the base of the burner tube should be filled with gas.

C. The air-hole at the base of the burner tube should be closed.

D. The gas pressure at the base of the burner tube is increased.

The correct answer is option [C].

18 Which of the following methods are ways of preventing the rusting of iron?

[i] The use of tar and enamel

[ii] The use of grease and oil.

[iii] Galvanizing the iron.

[iv] Electroplating the iron.

A. [i], [ii] and [iv].

B. [i], [ii], and [iii].

C. [i], [ii], [iii] and [iv].

D. [ii], [iii] and [iv].

The correct answer is option [C].

19. A gradual warming of planet earth is called _____

A. greenhouse effect.

B. pollution.

C. ozone depletion.

D. none of the above.

The correct answer is option [A].

20. Corrosion of metals is accelerated by the presence of _____

A. carbon (II) oxide and sulphur (VI) oxide.

B. carbon (IV) oxide and sulphur (IV) oxide.

C. nitrogen (IV) oxide and carbon (IV) oxide.

D. carbon (II) oxide and sulphur (IV) oxide.

The correct answer is option [B].

21. What increases the luminosity of a flame?

A. Increase in supply of oxygen.

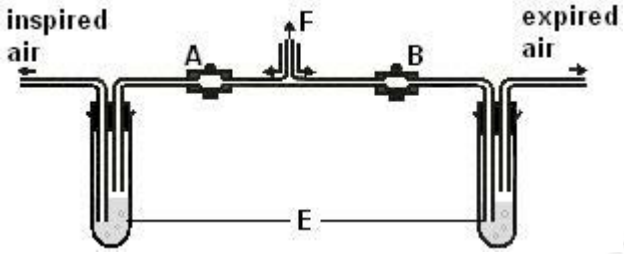
B. Increase in temperature of solid particles.

C. Increase in temperature or pressure of oxygen.

D. Increase in temperature or pressure of burning gases.

The correct answer is option [D].

22. The diagram drawn is an illustration to study _____



A. CO_2 is more in inspiration than expiration.

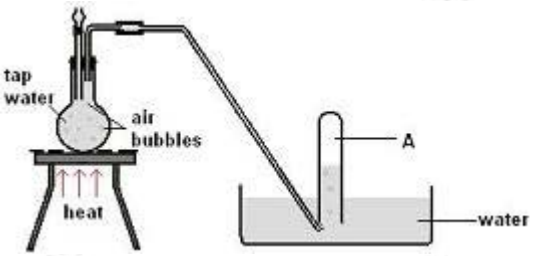
B. CO is more in inspiration than expiration.

C. CO is more in expiration than inspiration.

D. CO_2 is more in expiration than inspiration.

The correct answer is option [D].

23. The diagram drawn is an illustration of an experiment used to _____



A. study the presence of CO_2.

B. find out if tap water dissolves in air.

C. study the absence of air in water.

D. find if air contains CO_2.

The correct answer is option [B].

24. Which pollutant causes brain damage, dizziness, headaches, fatigue and lethargy?

A. CO.

B. $PbBr_2$.

C. Pb.

D. CO_2.

The correct answer is option [A].

25. These gases burn with blue flame except _____

A. H_2.

B. CH_4.

C. C_2H_2.

D. CO.

The correct answer is option [C].

26. The following statements explains burning except _____

A. burning is a oxidation process.

B. burning must involve iron.

C. burning gives out large amount of heat.

D. burning is an active rapid process.

The correct answer is option [B].

27. When pollutants are trapped in air above the earth's surface it forms _____

A. smog.

B. soot.

C. dust.

D. smoke.

The correct answer is option [D]

28. Which of the pollutants causes eye, nose, throat irritation and respiratory tissues?

A. oxides of nitrogen.

B. oxides of sulphur.

C. oxides of sulphur and oxides of nitrogen.

D. oxides of carbon.

The correct answer is option [C].

29. Which of the following options is not an element?

A. americium.

B. zirconium.

C. water.

D. radon.

The correct answer is option [C].

30. The component of air that is removed when air is bubbled into alkaline pyrogallol solution is _____

A. carbon (IV) oxide.

B. helium.

C. nitrogen.

D. oxygen.

E. water vapour.

The correct answer is option [C].

31. Which of the noble gases is used in the electric lamps to prevent oxidation of the lamp filaments?

A. Krypton.

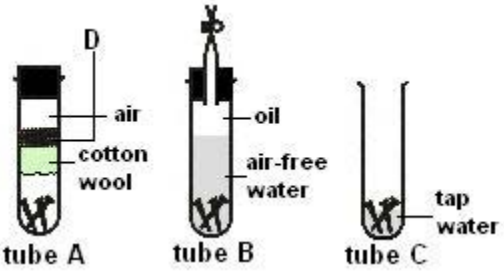
B. Radon.

C. Neon

D. Argon.

The correct answer is option [D].

32. The diagram drawn is an illustration of the experiment to _____



A. show the rusting of iron.

B. study the mechanism of rusting of iron.

C. show that air and moisture are necessary for the rusting of iron.

D. study the process of rusting of iron.

The correct answer is option [C]

33. Which of the following is correct about the zones identified by a non-luminous flame?

(i) the unburnt gas zone.

(ii) the luminous zone.

(iii) the outermost non-luminous zone.

A. (iii) only.

B. (i) and (iii).

C. (ii) only.

D. (i), (ii) and (iii).

The correct answer is option [D].

34. Which noble gas is used in the photographer's flash tube?

A. Neon and helium.

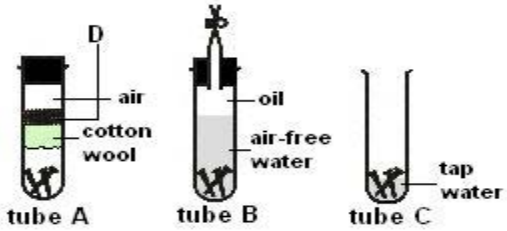
B. Argon and xenon.

C. Krypton and xenon.

D. Radon and neon.

The correct answer is option [C].

35. From the diagram drawn, tube C contains _____



A. water alone.

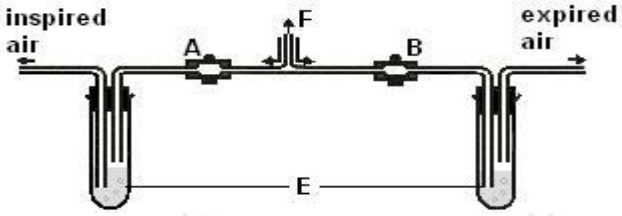
B. oil alone.

C. air and water.

D. air alone.

The correct answer is option [C].

36. The diagram drawn, the part labelled E is _____



Author: www.teststreams.com

A. quick lime.

B. slaked lime.

C. carbonated lime.

D. lime water.

The correct answer is option [D].

37. A region where gases combine chemically with the production of heat and light is known as _____

A. fire.

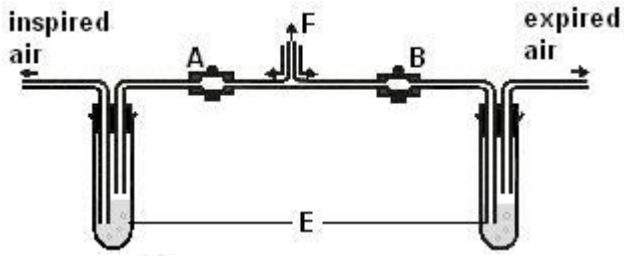
B. explosion.

C. glow.

D. flame.

The correct answer is option [D].

38. The diagram drawn, the part labelled F is _____



A. to mouth.

B. to reagent.

C. to water.

D. to air.

The correct answer is option [A].

39 Combustion is a chemical reaction which is always accompanied by _____

A. heat.

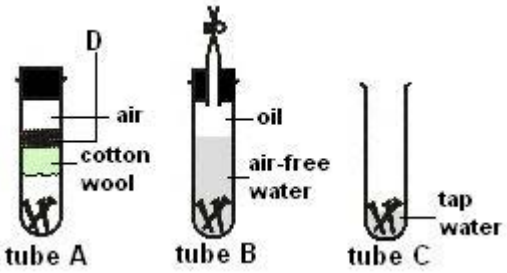
B. heat and light.

C. heat and energy.

D. heat and power.

The correct answer is option [B].

40. From the diagram drawn, tube A contains _____



A. water alone.

B. air and water.

C. oil alone.

D. air alone.

The correct answer is option [D].

41. The following are major gaseous pollutants except _____

A. oxides of carbon e.g. CO.

B. oxides of sulphur e.g. SO_2.

C. chlorofluorocarbon.

D. carbon (IV) oxide.

The correct answer is option [D].

42. The most abundant noble gas in nature is _____

A. Neon.

B. Radon.

C. Helium.

D. Argon.

The correct answer is option [D].

43. To produce a non-luminous bunsen flame, _____

A. the air-hole at the base of the burner tube should be opened.

B. the air-hole at the base of the burner tube should be filled with gas.

C. the air-hole at the base of the burner tube should be closed.

D. the gas pressure at the base of the burner tube is reduced.

The correct answer is option [A].

TOPIC: ATOMIC STRUCTURE. CHEMICAL COMBINATION

DIRECTION: Choose the correct answer from the lettered options.

1. The arrangement of ions in a regular pattern in a solid crystal is called _____

A. configuration.

B. atomic structure.

C. lattice.

D. buffer.

The correct answer is option [C].

2. Which of the following noble gases has electronic structure similar to that of N in NH_3?

[147N]

A. $_{2}He$.

B. $_{10}Ne$.

C. $_{18}Ar$.

D. $_{36}kr$

The correct answer is option [B].

3. Water has a rather high boiling point despite its low molecular mass because of the presence of _____ bonding.

A. covalent

B. dative

C. hydrogen

D. ionic

The correct answer is option [C].

4. _____ are different forms of the same element in the same physical state.

A. Isotopes.

B. Allotropy.

C. Isotopy.

D. Allotropes.

The correct answer is option [D].

A gaseous hydride of nitrogen, X, contains 87.5 % by mass of nitrogen. The relative molecular

mass of X is 32.

When X is heated, it gives off a mixture of nitrogen gas and hydrogen gas.

5. What is the total volume of the mixture of gases produced when 100 cm^3 of X is heated?

A. 200 cm^3.

B. 400 cm^3.

C. 100 cm^3.

D. 600 cm^3.

The correct answer is option [B].

6. The principle which states that two electrons in the same atom cannot have the same values for all four quantum numbers is known as _____

A. Hund's rule.

B. Pauli Exclusion Principle.

C. Uncertainty Principle.

D. none of the above.

The correct answer is option [B].

7. Which of the following electronic configuration is correct for sulphur with atomic number of 16?

A. $1s^2 2s^2 2p^4$.

B. $1s^2 2s^2 2p^6 3s^2 3p^4$.

C. $1s^2 2s^2 2p^6 3s^2 3p^6$.

D. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$.

The correct answer is option [B].

8. An element belongs to a period in the periodic table because of _____

A. the number of electrons in its outer-most shell.

B. the number of shell.

C. the electronic configuration in the azimuthal quantum number.

D. the size of the atom.

The correct answer is option [A].

9. A solid substance with high melting and boiling points is likely to be _____

A. a covalent compound.

B. a dative covalent compound.

C. an electrovalent compound.

D. a non-metal.

The correct answer is option [C].

10. When energy needed to break up bonds is greater than energy liberated on hydration of ions in an ionic compound the compound is said to be _____

A. soluble.

B. hydrated.

C. insoluble.

D. dissociated.

The correct answer is option [C].

11. An ionic bond is often formed when _____.

[i] the combining atoms need to lose electrons in order to attain a noble gas configuration

[ii] the combining atoms both need to gain electrons in order to attain a noble gas configuration

[iii] two non-metallic elements react together

[iv] a metallic element combines with a non-metallic element.

A. [i] only.

B. [i], [ii] and [iii] only.

C. [i] and [ii] only.

D. [iv] only.

The correct answer is option [D].

12. A solid which melts at 1020oC and is an electrolyte when molten. This solid has _____

A. a molecule structure.

B. a giant atomic structure.

C. a metallic structure.

D. a giant ionic structure.

The correct answer is option [D].

Reason: The particles in a giant structure are joined together by strong bonds to form a large, three-dimensional arrangement in which no free individual units exist. The giant structures are very difficult to pull apart and so have high melting and boiling points and they are solids at room temperature. Electrical effects distinguish the giant structures. Only giant ionic structures conduct electricity [and are decomposed by it] when molten or dissolved in water.

13. The bond between two iodine molecules is _____

A. co-ordinate bond.

B. electrovalent bond.

C. ionic bond.

D. covalent bond.

E. Van der waal's forces.

The correct answer is option [D].

14. Which of the following compounds has the strongest hydrogen bond

[i] H.F

[ii] HCl

[iii] H_2O.

[iv] HBr.

A. [i] only.

B. [i] and [ii] only.

C. [i], [ii] and [iv] only.

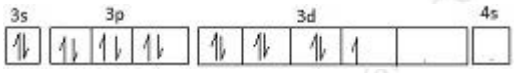
D. [iii] only.

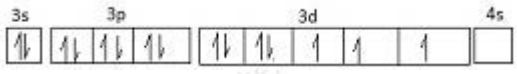
The correct answer is option [A].

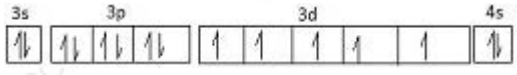
Reason: The strongest hydrogen bonds are in hydrogen fluoride where the simple HF molecules are held together by hydrogen bonds to form larger aggregates of H_2F_2 H_3F_3 etc.

15. Which of the following is the correct order of filling electrons in the third and fourth shells of the element 25X?

A.

B. 

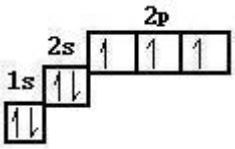
C. 

D. 

The correct answer is option [D].

16. The orbital diagram drawn shows the electronic configuration of _____

A. chlorine.



B. nitrogen.

C. calcium.

D. neon.

The correct answer is option [B].

Reason: Nitrogen has five electrons.

17. All of the following elements except _____ exhibits an isotope.

A. $35_{17}Cl$ $^{37}_{17}Cl$

B. $^{1}_{1}H$ $^{2}_{1}H$ $^{3}_{1}H$

C. $^{12}_{6}C$ $^{13}_{6}C$

D. $^{14}_{17}N$ $^{14}_{17}N$

The correct answer is option [D].

18. Which of the following is the correct shapes of all molecules?

[i] linear molecules

[ii] non-linear molecules

[iii] spherical molecule.

A. [ii] and [iii].

B. [i] and [ii].

C. [i] and [iii].

D. [i], [ii] and [iii].

The correct answer is option [B].

The shapes of molecules are linear and non-linear.

19. The property of the element that varies in relation to their atomic masses is _____

A. periodicity.

B. periodic table.

C. periodic law.

D. none of the above.

The correct answer is option [C]

20. Elements in the same group in the periodic table have the same _____

A. atomic mass.

B. valence electrons.

C. shells.

D. atomic number.

The correct answer is option [B].

21. Hund's rule states that _____

A. two electrons in the same atom cannot have the same values for all four quantum numbers.

B. when electrons are to occupy the sub-orbitals of the same n and l values, the electrons would tend to occupy the orbitals singly until each orbital is occupied before pairing.

C. no two electrons in an atom can have all four quantum numbers n, l, m and ms identical.

D. when electrons occupy the sub-orbitals of the same n and l values, the electrons would tend to occupy an orbital by pairing.

The correct answer is option [B].

22. The type of bond formed when two elements $_{17}X$ and $_{19}Y$ combine together is _____

A. covalent.

B. coordinate.

C. electrovalent.

D. hydrogen.

The correct answer is option [C].

23. Which of the following option is not a type of intermolecular interactions?

A. Neutral molecular-neutral molecule interaction.

B. Neutral molecule-neutral molecule interaction.

C. Dipolar molecule-neutral molecule interaction.

D. Dipolar molecule-dipolar molecule interaction.

The correct answer is option [A].

Solution: Intermolecular forces also known as van der waals forces are short - range forces that arise from three main types of intermolecular interactions namely

[i] neutral molecule-neutral molecule interaction

[ii] dipolar molecule-neutral molecule interaction

[iii] dipolar molecule-dipolar molecule interaction.

24. Sodium atoms and sodium ions _____

A. are chemically identical.

B. have the same number of electrons.

C. have the same number of protons.

D. react and form compounds with covalent bonds.

The correct answer is option [C].

25. The first element of the periodic table is _____

A. hydrogen.

B. helium.

C. nitrogen.

D. oxygen.

The correct answer is option [A].

26. The bond type between copper [ii] ions and water molecule is _____

A. electrovalent bond.

B. covalent bond.

C. dative covalent bond.

D. hydrogen bond.

The correct answer is option [C].

Reason: The hydrogen of copper [ii] ion is due to the formation of coordinate covalent bond. The copper [ii] ions has no electrons in its outermost shell it accepts four lone pair of electrons from four water molecules.

27. _____ is the same for an element and its isotope.

A. Mass number

B. Number of neutrons

C. Number of protons and neutrons

D. Atomic number

The correct answer is option [D].

28. What is the type of bond present in methane?

A. Covalent bond.

B. Ionic bond.

C. Coordinate covalent bond.

D. Metallic bond.

The correct answer is option [A].

Reason: Electrons are shared.

29. In the atomic notation ${}^{x}_{y}A$, _____

A. x is the atomic number of the element.

B. y is the atomic number of the element.

C. x is the number of protons in the element.

D. x is the number of electrons in the element.

The correct answer is option [B].

30. Element X is in Group 1 of the periodic table. It is likely to be _____

A. a very reactive non-metal.

B. an element which readily forms X^- ions.

C. a dense hard metal with a high melting point.

D. a light, soft metal with a low melting point.

The correct answer is option [D].

Reason: The metallic bond in group 1 is strong but can easily be broken when energy is applied.

31. Ionic or electrovalent bonding occurs when _____

A. a metal or aluminium radical combine with a metal or radical.

B. two or more non-metals combine together.

C. a metal or ammonium radical combines with a non-metal or radical.

D. two or more non-metals combine together and one of the atom donates more of the electron.

The correct answer is option [C].

32. From the electronic configuration$1s^2 2s^2 2p^6 3s^2 3p^5$,, determine the number of electrons in the outermost shell.

A. 7.

B. 5.

C. 2.

D. 8.

The correct answer is option [A].

33. What is the maximum number of electron contained in the third shell?

A. 2.

B. 18.

C. 8.

D. 32.

The correct answer is option [B].

Solution: Using the equation 2n2

here n = number of shell n = 3. Therefore, 2[3]2 = 2 × 9 = 18.

34. When the energy needed to break up bonds is less than energy liberated on hydration of ions in an ionic compound, the compound is _____

A. Soluble.

B. Insoluble.

C. Hydrated.

D. None of the above.

The correct answer is option [A].

35. If iron is denoted as 5626Fe, then the nucleus of the iron atom contains _____

A. 56 protons and 26 neutrons.

B. 30 protons and 26 neutrons.

C. 26 protons and 30 neutrons.

D. 28 protons and 28 neutrons.

The correct answer is option [C].

36. If the atomic number of an element is 10, then the outermost shell will have _____electrons.

A. 2

B. 3

C. 8

D. 6

The correct answer is option [C].

37. Rare gases are stable because they _____

A. are monatomic.

B. forms ions easily.

C. are volatile gases.

D. have duplet or octet electronic configurations in the outermost shells of their atoms.

The correct answer is option [D].

38. What is the type of bond present in calcium oxide?

A. Covalent bond.

B. Metallic bond.

C. Ionic bond.

D. Coordinate covalent bond.

The correct answer is option [C].

Reason: Electrons are donated and accepted by the individual elements.

39. How many protons are there in a metallic ion (X3+) which has an inert gas structure and contains 10 electrons?

A. 3.

B. 7.

C. 10.

D. 13.

The correct answer is option [D].

40. The species that can donate electron pairs for complex formation with metal ions is called _____

A. hydrogen bond.

B. ligand.

C. covalent bond.

D. inter molecular forces.

The correct answer is option [B].

41. The number of protons of an atom is the same as the _____

A. mass number.

B. atomic weight.

C. atomic number.

D. weight number.

The correct answer is option [C].

42. The Uncertainty Principle states that _____

A. the position of the measure of the momentum of an electron can be known with certainty.

B. the position of the measure of the momentum of an electron cannot be known.

C. the position of the accurate measure of the momentum of an electron can be known with certainty.

D. the position of the accurate measure of the momentum of an electron cannot be known with certainty.

The correct answer is option [D].

43. All of the following options are properties of ionic or electrovalent compounds except _____

A. ionic compounds are composed of two or more different kinds of oppositely charged ions.

B. ionic compounds, when molten or in aqueous solution, are electrolytes.

C. ionic compounds are usually soluble in water but do not dissolve in organic solvents.

D. ionic compounds are often insoluble in water but dissolve more readily in organic solvents.

The correct answer is option [D].

Solution: Covalent compounds are insoluble in water not ionic compounds and also dissolve more readily in organic solvents.

44. If force is applied to an electrovalent/ionic crystal, _____

A. the shape will be deformed.

B. the shape will not be deformed.

C. the crystal will not be fractured.

D. the shape and the crystal structure will be deformed.

The correct answer is option [D].

45. Which of the following pairs are allotropes?

A. Carbon [graphite] and Sulphur [monoclinic].

B. Carbon [diamond] and Sulphur [monoclinic].

C. Sodium chloride and caesium chloride.

D. Phosphorus [white] and Phosporus [red].

The correct answer is option [D].

46. Co-ordinate (dative) bonding is formed _____

A. between atoms adjacent to each other in the periodic table.

B. when one of the participants possesses a lone pair of electrons.

C. between atoms that have the same number of valence electrons.

D. between atoms that can take part in transfer of electrons.

The correct answer is option [B].

47. In going across period 3 [from sodium to argon] of the periodic table, it is noticed that _____

A. the first ionization energy increases.

B. the atomic size increases to the middle of the period and then decreases.

C. there is a gradual change in the oxides from basic to acidic [argon does not form an oxide].

D. there is a gradual decrease in electronegativity.

The correct answer is option [D].

48. A phenomenon whereby atoms of an element exhibit different mass numbers but have the same atomic number is _____

A. isotropy.

B. atomic weight.

C. isotopes.

D. none of the above.

The correct answer is option [A].

49. If X is a group III element, its oxide would be represented as _____

A. X_3O_2.

B. X_3O.

C. X_2O_3.

D. XO_3.

The correct answer is option [C].

50. Which of the following species correctly represents an ion of M with 13 protons and 10 electrons

A. $_{10}M^{3+}$.

B. . $_{10}M^{3-}$.

C. $_{13}M^{3+}$.

D. $_{13}M^{3-}$. .

The correct answer is option [C].

51. The simplest three-dimensional arrangement which is regularly repeated throughout a structure is _____

A. unit cell.

B. atom.

C. molecule.

D. electron.

The correct answer is option [A].

52. What is the name of the scientist that discovered the neutron?

A. Chadwick.

B. J. J. Thomson.

C. John Dalton.

D. Niels Bohr.

The correct answer is option [A].

53. Which element has an electronic configuration of $1s^2 2s^2 2p^6 3s^1$?

A. Calcium.

B. Chlorine.

C. Potassium.

D. Sodium.

The correct answer is option [D].

Sodium is made up of 2,8,1 electrons in its orbital.

54. A particle that contains 17 protons, 18 neutrons and 18 electrons is _____

A. a negative ion.

B. a neutral atom.

C. a positive ion.

D. an atom of a metal.

The correct answer is option [A].

55. The element with atomic number 10 is likely to have similar properties to the element with atomic number _____

A. 9.

B. 11.

C. 16.

D. 18.

The correct answer is option [D].

Reason: The element contains complete electrons in the shell or orbital.

56. Bonds between a highly electronegative atom and a hydrogen from another molecule is called _____

A. hydrogen bond.

B. covalent bond.

C. inter molecular forces.

D. ligand.

The correct answer is option [A].

57. Which of the following are properties of metallic bonding?

[i] They are solids at room temperature

[ii] They are ductile and malleable

[iii] They are good conductors of electricity

[iv] They are good conductors of heat.

A. [i], [ii] and [iv].

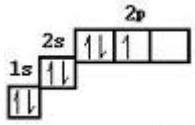
B. [ii], [iii] and [iv].

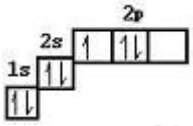
C. [i], [ii], [iii] and [iv].

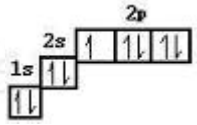
D. [i], [ii] and [iii].

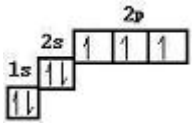
The correct answer is option [C].

58. Which of the following orbital diagrams best explains Hund's rule?

A. 

B. 

C. 

D. 

The correct answer is option [D].

59. Compounds with high melting and boiling points is a result of strong _____

A. covalent bonds.

B. metallic bonds.

C. ionic bonds.

D. van der waals forces.

The correct answer is option [C].

Reason: Electrovalent/Ionic compounds have high melting and boiling points because of the strong electrovalent/ionic bonds between the ions.

60. The sum of the protons and neutrons in an element is known as _____

A. atomic weight.

B. mass number.

C. atomic number.

D. weight number.

The correct answer is option [B].

61. The atomic mass of an atom is mostly due to the mass of _____

A. electrons and neutrons.

B. electrons and protons.

C. positrons and neutrons.

D. protons and neutrons.

The correct answer is option [D].

62. The type of bond between two atoms of an element with respective atomic number of 7, is _____

A. coordinate covalent.

B. covalent.

C. hydrogen.

D. ionic.

The correct answer is option [B].

63. In electrovalency, valence electrons are transferred and the atomic number is _____

A. also reduced.

B. stabilized.

C. unaffected.

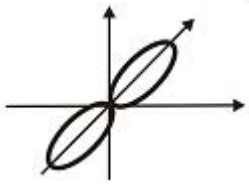
D. destabilized.

The correct answer is option [C].

Reason: Atomic number is the number of protons in an atom of an element.

Use the diagram to answer the question.

64. The diagram drawn shows the shape of _____ orbital.



A. d

B. p

C. sp2

D. sp3

The correct answer is option [B].

65. Which of the following elements has the highest electronegativity?

A. Chlorine.

B. Fluorine.

C. Nitrogen.

D. Oxygen.

The correct answer is option [A].

66. **Which of the following elements exhibits the same chemical properties as the atom $^{35}_{17}X$?**

A. An element with atomic number 17.

B. An element with atomic number 18.

C. An element with mass number 35.

D. An element with mass number 52.

The correct answer is option [A].

67. Which of the following statements is true about a closed container at s.t.p. which contains 11 g of P (carbon dioxide) and 8 g of Q (oxygen)?

A. The average kinetic energy of P is higher than the average kinetic energy of Q.

B. The partial pressure of P is higher than the partial pressure of Q.

C. The partial pressure for each gas becomes 0.5 atm when 1 dm 3of P is mixed with 1 dm3of Q.

D. P and Q do not contain the same number of molecules.

The correct answer is option [C].

68. Carbon has three isotopes, 126C,136C and 146C. If the relative abundance of these isotopes are 80%, 16%, and 4% respectively, the atomic mass of carbon will be _____

A. 12.00.

B. 12.50.

C. 12.10.

D. 12.24.

The correct answer is option [D].

Solution: [80 x 12/100] + [16 x 13/100] + [4 x 14/100] = 9.6 + 2.08 + 0.56 = 12.24.

69. _____is the type of bond present in a diatomic nitrogen gas.

A. double covalent bond.

B. triple covalent bond.

C. single covalent bond.

D. double electrovalent bond.

The correct answer is option [B].

70. Isotopes are atoms of the same element which have _____

A. the same mass number but different atomic numbers.

B. the same mass number and the same atomic number.

C. the same number of neutrons but different numbers of protons.

D. the same number of protons but different numbers of neutrons.

The correct answer is option [D].

TOPIC: ATOMS. MOLES. FORMULAE. EQUATIONS

DIRECTION: Choose the correct answer from the lettered options.

1. How many moles of potassium is needed to balance the given equation below?

$Fe[NO_3]_3(aq) + KSCN(aq) \rightarrow Fe[SCN]_3(aq) + KNO_3(aq)$

A. 2.

B. 4.

C. 1.

D. 3.

The correct answer is option [D].

2. The number of times the average mass of one atom of that element is heavier than one-twelfth the mass of one atom of carbon-12 is known as _____

A. relative molecular weight.

B. relative atomic weight.

C. relative molecular mass.

D. relative atomic mass.

The correct answer is option [D].

3. How many moles are there in 20g of ammonium trioxocarbonate [iv]?

A. 0.213 moles.

B. 0.260 moles.

C. 0.208 moles.

D. 0.280 moles.

The correct answer is option [C].

Solution: Number of moles of substance = mass of substance/molar mass

where mass of ammonium trioxocarbonate = 20g, molar mass of ammonium tiroxocarbonate =

$[N]_2$ → 14 x 2 = 28
$[H_4]_2$ → 1 x 4 x 2 = 8
C = 12 x 1 = 12
O_3 → 16 x 3 = 48
28 + 8 + 12 + 48 = 96g/mol
therefore, number of moles = $^{20}/_{96}$ = 0.208 moles.

4. What is atomic mass unit of sulphur?

A. 23 amu.

B. 35.5 amu.

C. 32 amu.

D. 16 amu.

The correct answer is option [C].

Solution: The atomic mass unit of sulphur is equivalent to the mass of sulphur with no unit.

5. 6g of metal M react completely with 23.66g of chlorine to form 29.66g of the metallic chloride. Find the empirical formula of the metallic chloride.

[M = 27, Cl = 35.5]

A. MCl.

B. MCl_3.

C. MCl_2.

D. M_3Cl.

The correct answer is option [B].

	M	Cl
Mole ratio	$\frac{6g}{27g/mol}$	$\frac{23.66g}{35.5g/mol}$
	0.222	0.666
$\frac{\text{Mole ratio}}{\text{Smallest ratio}}$	$\frac{0.222}{0.222} = 1$	$\frac{0.666}{0.222} = 3$

The empirical formula is MCl_3

6. Compounds which have the same molecular formular but different arrangements of atoms are called _____

A. polymers.

B. isomers.

C. isotopes.

D. allotropes.

The correct answer is option [B].

7. From the equation given below

$CNH_3[g] + BO_2[g] \rightarrow DNO[g] + AH_2O[g]$,

the value of D is _____

A. 3.

B. 5.

C. 4.

D. 6.

The correct answer is option [C].

Soltuion: From the equation of reaction to balance the equation $NH^3[g] + O2[g] \rightarrow NO[g] + H2O$, balance hydrogen on both the left hand and right hand of the equation by placing a 4 in front of NH3 and a 6 in front of H_2O, hydrogen is balanced then balance NO by placing a 4 in front of NO. Oxygen is not balanced, balancing oxygen you place 5 in front of O. The equation of reaction is $4NH3[g] + 5O^2[g] \rightarrow 4NO[g] + 6H_2O[g]$.

8. What is the mass of 3 moles of oxygen atom?

A. 48.

B. 96.

C. 24.

D. 16.

The correct answer is option [A].

Solution: The relative atomic mass of oxygen atom is 16, therefore, 3 moles of oxygen atom is 3 x 16 = 48.

9. Which of the following options correctly balances the equation given below?

$Cu_2S[s] + O2[g] \rightarrow Cu_2O[s] + SO_2[g]$.

A. $2Cu_2S_{[s]} + 4O_{2[g]} \rightarrow 2Cu_2O_{[s]} + 2SO_{2[g}$

B. 2Cu2S[s] + 2O2[g] → 2Cu2O[s] + 2SO2[g].

C. $2Cu_2S_{[s]} + 3O_{2[g]} \rightarrow 2Cu_2O_{[s]} + 2SO_{2[g]}$.

D. Cu2S[s] + O2[g] → Cu2O[s] + SO2[g].

The correct answer is option [C].

Solution: Balance Cu2S Cu2O and SO2 by putting 2 to all → 2Cu2S[s] + O2[g] → 2Cu2O[s] + 2SO2[g]

Balance oxygen on the left hand side by putting 3 before O2 → 2Cu2S[s] + 3O2[g] → 2Cu2O[s] + 2SO2[g].

10. An atom is _____

A. the smallest particle of an element which can take part in a chemical reaction.

B. the smallest particle which can take part in a chemical reaction.

C. the smallest particle which can take part in a reaction.

D. the smallest particle which can take part in a physical reaction.

The correct answer is option [A].

11. What is atomic mass unit of fluorine?

A. 19 amu.

B. 40 amu.

C. 31 amu.

D. 39 amu.

The correct answer is option [A].

Solution: The atomic mass unit of fluorine is equivalent to the mass of fluorine with no unit.

12. Find the relative molecular mass of ammonium trioxocarbonates [IV].

A. 94.

B. 96.

C. 77.

D. 78.

The correct answer is option [B].

Solution: First write the chemical formulae of the compound. Ammonium → NH4+1

Trioxocarbonate → CO_3^{-2}.
Then the chemical formulae of the compound is $[NH_4]_2CO_3$.
The relative molecular mass is $[N]_2$ → 14 x 2 = 28
$[H_4]_2$ → 1 x 4 x 2 = 8
C → 12 x 1 = 12
O_3 → 16 x 3 = 48.
Addition gives 28 + 8 + 12 + 48 = 96.

13. To balance the equation given below;

$NH_{3(g)} + Cl_{2(g)} \rightarrow N_{2(g)} + NH_4Cl_{(s)}$

we need to add _____

A. 2 before NH3 and 2 before NH_4Cl.

B. 4 before NH3, 2 before Cl_2, and 2 before NH_4Cl.

C. 6 before NH3, 2 before Cl_2, and 3 before NH_4Cl.

D. 8 before NH3, 3 before Cl_2, and 6 before NH_4Cl.

The correct answer is option [D].

14. From the equation given below

$XNH_{3[g]} + YO_{2[g]} \rightarrow ZNO_{[g]}$

the value of Z is ____

A. 4.

B. 7.

C. 6.

D. 5.

The correct answer is option [A].

Hint: Balance the equation of reaction.

15. The atomic number of an element, M, is 13. That of another element, N, is 8. M and N form a compound of formula _____

A. MN.

B. MN_2.

C. M_2N.

D. M_2N_3.

The correct answer is option [D].

16. The major difference between

SO3 and

SO32- is that _____

A . SO_3 is a molecule while SO_3^{2-} is an atom.

B. SO_3 is a radical while SO_3^{2-} is a molecule

C. SO_3 is a molecule while SO_3^{2-} is a radical.

D. SO_3 is a radical while SO_3^{2-} is an atom.

The correct answer is option [C].

17. The number of particle 0.2 moles of a substance contain _____

A. 1.204×10^{23}atoms.

B. 1.204×10^{23}particles.

C. 12.04×10^{23}particles.

D. 12.04×10^{23}atoms.

The correct answer is option [B].

Solution: Number of particles = Number of moles of a substance x 6.02 x 1023particles where number of moles = 0.2 moles, therefore, Number of particles = 0.2 x 6.02 x 1023particles = 1.204 x 1023partcles.

18. Which of the following best explains matter?

[i] Atoms

[ii] Molecules

[iii] Ions.

A. [i] and [ii] only.

B. [ii] only.

C. [i], [ii], and [iii].

D. [ii] and [iii] only.

The correct answer is option [C].

19. The empirical formular of C_6H_6 is _____

A. CH.

B. C_3H_3.

C. C_6H_6.

D. 3CH.

The correct answer is option [A].

20. A molecule of neon is _____

A. diatomic.

B. ionic.

C. triatomic.

D. monatomic.

The correct answer is option [D].

21. Atomicity of ozone is _____

A. 1.

B. 2.

C. 3.

D. 4.

The correct answer is option [C].

Solution: Ozone is composed of three atoms.

22. One mole of oxygen atoms _____

A. has a molar mass of 32g.

B. has 6.02×10^{23} molecules

C. can be represented as O_2.

D. contains Avogadro's number of atom.

The correct answer is option [D].

Avogadro's number is 6.02×10^{23} since one mole of oxygen atoms is asked the answer is 6.02×10^{23}atoms.

23. How many atoms are contained in 1 mole of hydrogen molecule?

A. 18.09×10^{23}atoms.

B. 12.06×10^{23}atoms.

C. 6.02×10^{23}atoms.

D. 6.02×10^{23}molecules.

The correct answer is option [C].

Since the amount of atoms is required your answer is in atoms.

24. What is a radical?

A. Group of atoms of an element which acts as a single compound in a reaction.

B. Group of atoms which acts as a single unit in a chemical reaction

C. Group of atoms of an element which acts as a single element in a reaction.

D. Group of atoms of a compound which acts as a single unit in a molecular formula.

The correct answer is option [B].

25. The modern standard element with which chemists define relative atomic mass is _____

A. ^{12}C.

B. ^{13}C.

C. ^{3}H.

D. ^{14}C.

The correct answer is option [A].

26. Find the number of moles of a substance which contains 3.01×10^{22}electrons.

A. 20 moles.

B. 0.5 moles.

C. 0.05 moles.

D. 5 moles.

The correct answer is option [C].

Solution: Number of moles of a substance = Number of particles/6.02 x 10^{23}particles where number of particles = 3.01 x 10^{22}electrons, therefore, number of moles = 3.01 x 10^{22}electrons/6.02 x 10^{23}electrons = 0.05 moles.

27. The number of atoms in each molecule of an element is called _____

A. element.

B. atoms.

C. ions.

D. atomicity.

The correct answer is option [D].

28. A molecule is the smallest particle of _____

A. a matter that can exist in Free State.

B. an element that can exist in Free State.

C. a radical that can exist in Free State.

D. a lattice that can exist in Free State.

The correct answer is option [A].

29. The atomic mass of hydrogen had to change from 1.00 to 1.008 when _____

A. more sensitive balances were manufactured.

B. the standard of reference became C12 isotope.

C. the figure was corrected to three significant figures.

D. the phenomenon of isotopy was discovered.

The correct answer is option [B].

30. The percentage by mass of lead in lead [II] trioxonitrate [V] is _____

[Pb = 108; N = 14; O = 16]

A. 46.55%.

B. 12.07%.

C. 41.38%.

D. 64.55%.

The correct answer is option [A].

Solution: Obtain the mass of each individual element in the compound. The chemical formulae of the lead [II] trioxonitrate [v] = $Pb[NO_3]_2$, then obtain the mass of each element → Pb = 108g/mol

$[N]2$ = 14 x 2 = 28g/mol; $[O_3]2$ = 16 x 3 x 2 = 96g/mol. addition gives mass of the compound = 108 + 28 + 96 = 232, therefore, the percentage by mass of nitorgen = 108/232 x 100 = 46.55%.

31. How many atoms are there in 4g of carbon?

A. 2.01×10^{22}.

B. 2.01×10^{21}.

C. 2.01×10^{24}.

D. 2.01×10^{23}.

The correct answer is option [D].

Solution: Number of moles of carbon = mass of carbon/molar mass, where mass of carbon = 4g, molar

mass = 12g/mol, then number of moles = $^{4}/_{12} = {}^{1}/_{3}$ moles. Number of atoms = Number of moles of a substance x 6.02 x 10^{23}particles where number of moles = 0.0045 moles, therefore, Number of atoms = $^{1}/_{3}$ x 6.02 x 10^{23} = 2.01 x 10^{23}.

32. If the relative molecular mass of CH2O is 60, its empirical formular is _____

A. 4.

B. 1.

C. 2.

D. 3.

The correct answer is option [C].

Solution: The molar mass of CH_2O is C = 12 x 1 = 12g/mol

H_2 = 1 x 2 = 2g/mol

O = 16 x 1 = 16g/mol

→ 12 + 2 + 16 = 30

Let the empirical formula be x

where the relative molecular mass = 60.

Therefore, 30x = 60

x = 60/30 = 2.

33. The law that states that all pure samples of a particular chemical compound contain similar elements combined in the same proportion by mass is _____

A. the law of conservation of mass.

B. the law of definite proportions.

C. the law of chemical combination.

D. the law of multiple proportions.

The correct answer is option [B].

34. 0.0045 moles would contain _____ amount of electrons.

A. 2.709×10^{12}particles

B. 2.709×10^{21}atoms

C. 2.709×10^{21}electrons

D. 27.09×10^{21}electrons

The correct answer is option [C].

Solution: Number of particles = Number of moles of a substance x 6.02×10^{23}particles where number of moles = 0.0045 moles, therefore, Number of particles = 0.0045 x 6.02×10^{23}electrons, since amount of electrons is what is asked and answer should be left in electrons. Answer is 2.709 x 1021electrons.

35. From the equation below,

NH3(g) + O2(g) → H2O(g) + N2(g),

Find the number of moles of N_2 that is yielded when 34g of NH3 reacts with oxygen.

A. 2 moles.

B. 1 mole.

C. 4 moles.

D. 3 moles.

The correct answer is option [B]. Solution: Hint [Balance the equation of reaction]; $4NH_3(g) + 3O_2(g) \rightarrow 6H_2O(g) + 2N_2(g)$; then convert the required compounds to solve to mass → 68g of NH_3; 56g of N_2; 34g of NH_3. Then number of moles required to yield N_2; 68g of NH_3 yields 56g of N_2 and 34g of NH_3 yields $^{34}/_{68} \times 56 = 28$g. Therefore number of moles of N_2 = $^{\text{Mass of nitrogen gas}}/_{\text{Molar mass of N2}} = {}^{28}/_{28} = 1$ mole.

36. The atomic mass unit is equal to the relative atomic mass.

A. False.

B. True.

C. The atomic mass unit has no unit.

D. All of the above.

The correct answer is option [B].

37. The numerical coefficient in a balanced equation gives _____

A. the number of moles of reactants and products.

B. the molar mass of the reactants and products.

C. the number of moles of reactants only.

D. the number of molecules and atoms of products only.

The correct answer is option [A].

38. From the equation given below

$CNH_3[g] + BO_2[g] \rightarrow DNO[g] + AH_2O[g]$,

the value of C is _____

A. 5.

B. 4.

C. 3.

D. 6.

The correct answer is option [B].

Solution: From the equation of reaction to balance the equation $NH_3[g] + O_2[g] \rightarrow NO[g] + H_2O$, balance hydrogen on both the left hand and right hand of the equation by placing a 4 in front of NH_3 and a 6 in front of H_2O, hydrogen is balanced then balance NO by placing a 4 in front of NO. Oxygen is not balanced, balancing oxygen you place 5 in front of O. The equation of reaction is $4NH_3[g] + 5O_2[g] \rightarrow 4NO[g] + 6H_2O[g]$.

39. 1 mole of a substance contains _____

A. 6.02×10^{23}atoms.

B. 6.02×10^{23}electrons.

C. 6.02×10^{23}particles.

D. 6.02×10^{-23}particles.

The correct answer is option [C].

Solution: Particles includes atoms, molecules, electrons, ions.

40. What is molar mass?

A. The mass of one atom of a substance expressed in grams.

B. The mass of one molecule of a substance expressed in grams.

C. The mass of one mole of a substance expressed in grams.

D. The weight of one mole of a substance expressed in grams.

The correct answer is option [C].

41. A certain compound on analysis yielded 6g carbon, 1g hydrogen and 8g oxygen. If the relative molecular mass of the compound is 60, its molecular formula is _____.

[C = 12, H = 1, O = 16]

A. CH_3COOH.

B. CH_3COH.

C. CH_3OH.

D. CH_3CO.

The correct answer is option [A].

	C	H	O
	6g	1g	8g
Mole ratio	$\frac{6g}{12g/mol}$	$\frac{1g}{1g/mol}$	$\frac{8g}{16g/mol}$
	0.5	1	0.5
Mole ratio / Smallest ratio	$\frac{0.5}{0.5} = 1$	$\frac{1}{0.5} = 2$	$\frac{0.5}{0.5} = 1$

The empirical formula is CH_2O
Molecular formula when relative molecular mass is 60. $[CH_2O]_n = 60$: Formula mass of compound = $12 + [1x2] + 16 = 12 + 2 + 16 = 30n$; $30 = 60$
$n = 60/30 = 2$: $[CH_2O]_2 = C_2H_4O_2$
The molecular formula is CH_3COOH.

42. Determine the empirical formula of a compound that contains 62.54% of lead, 8.46% of nitrogen and 29.00% of oxygen by mass.

[Pb = 207, N = 14, O = 16]

A. $PbNO_3$.

B. PbN_2O_3.

C. $Pb[NO_3]_2$

D. $Pb[NO_3]_3$.

The correct answer is option [C].

	Lead	Nitrogen	Oxygen
	62.54%	8.46%	29.00%
Mole ratio	$\frac{62.54}{207}$	$\frac{8.46}{14}$	$\frac{29.00}{16}$
	0.3021	0.6043	1.8125
Mole ratio / Smallest ratio	$\frac{0.3021}{0.3021}$	$\frac{0.6043}{0.3021}$	$\frac{1.8125}{0.3021}$
	1	2	6

The empirical formula is $PbN_2O_6 = Pb[NO_3]_2$

43. Which of the following statements about the number of atoms they contain is true?

(i) one mole of hydrogen.

(ii) one mole of oxygen.

(iii) one mole of water.

A. (i)>(ii)>(iii).

B. (ii)>(i)>(iii).

C. (i) = (ii) = (iii).

D. (iii)>both (i) & (ii), but (ii) = (i).

The correct answer is option [D].

44. The law which states that matter is neither created nor destroyed during chemical reaction but changes from one form to another is the _____

A. law of chemical combination.

B. law of multiple proportions.

C. law of conservation of mass.

D. law of definite proportions.

The correct answer is option [C].

45. From the equation given below

$CNH_3[g] + BO_2[g] \rightarrow DNO[g] + AH_2O[g]$,

the value of B and A is _____

A. 3 and 5.

B. 4 and 6.

C. 6 and 5.

D. 5 and 6.

The correct answer is option [D].

Solution: From the equation of reaction to balance the equation NH3[g] + $O_2[g] \rightarrow NO[g] + H_2O$, balance hydrogen on both the left hand and right hand of the equation by placing a 4 in front of NH_3 and a 6 in front of H_2O, hydrogen is balanced then balance NO by placing a 4 in front of NO. Oxygen is not balanced, balancing oxygen you place 5 in front of O. The equation of reaction is $4NH_3[g] + 5O_2[g] \rightarrow 4NO[g] + 6H_2O[g]$.

46. The percentage of oxygen in sulphur [IV] oxide [S = 32, O = 16] is _____

A. 5%.

B. 50%.

C. 52%.

D. 25%.

The correct answer is option [B].

Solution: Write the chemical formula of the molecule which is SO_2

Relative Atomic Mass is S = 32 x 1 = 32g/mol

O_2 = 16 x 2 = 32g/mol → 32 + 32 = 64g/mol. Percentage of oxygen O_2 = 32/64 x 100% = 50%.

47. The number of moles of a substance which contains 0.0285×10^{25}atoms is _____

A. 2.1 moles.

B. 4.7 moles.

C. 0.047 moles.

D. 0.47 moles.

The correct answer is option [D].

Solution: Number of moles of a substance = Number of particles/6.02×10^{23}particles where number of particles = 0.0285×10^{25}atoms, therefore, number of moles = 0.0285×10^{25}atoms/6.02×10^{23}atoms = 0.47 moles.

48. In $3Al_2(SO_4)_3$ there are _____

A. 3 atoms of Al, 3 atoms of S, and 4 atoms of O.

B. 2 atoms of Al, 3 atoms of S, and 4 atoms of O.

C. 6 atoms of Al, 3 atoms of S, and 12 atoms of O.

D. 12 atoms of Al, 9 atoms of S, and 12 atoms of O.

The correct answer is option [C].

49. A substance containing as many elementary entities as the number of atoms in exactly 12 grams of carbon-12 is called _____

A. mole.

B. molecule.

C. atomic mass unit.

D. Avogadro's number.

The correct answer is option [A].

50. The relative number of atoms in a compound is called _____

A. atomic number.

B. Avogadro number.

C. empirical formula.

D. molecular formula.

The correct answer is option [D].

51. Four of the following substances have something in common, which is the odd one?

A. Nickel.

B. Copper.

C. Sulphur.

D. Sodium.

The correct answer is option [C].

Solution: Sulphur is a non-metal.

52. The following are examples of radicals except _____

A. OH.

B. NH_3.

C. CO_3.

D. NH_4.

The correct answer is option [B].

Solution: NH3 is the chemical compound for ammonia gas which is not a radical.

53. Which of the following compound is heavier?

(i) 1 mole of Pbd_4

(ii) 1 mole of H_2 and

(iii) 1 mole of $Pb[NO_3]_2$

A. (ii) only.

B. (i) & (ii) only.

C. None of them.

D. (i), (ii) & (iii).

The correct answer is option [C].

54. Find the percentage by mass of nitrogen in potassium trioxonitrate [v].

[K = 39; N = 14; O = 16]

A. 47.5%.

B. 13.9%.

C. 38.6%.

D. 19.3%.

The correct answer is option [B].

Solution: Obtain the mass of each individual element in the compound. The chemical formulae of the potassium trioxonitrate [v] = KNO_3, then obtain the mass of each element → K = 39g/mol

N = 14g/mol

O_3 = 16 x 3 = 48. addition gives mass of the compound = 39 + 14 + 48 = 101

therefore, the percentage by mass of nitrogen = $14/_{101}$ x 100 = 13.9%.

55. $3H_2O(l)$ is _____

A. three moles of water.

B. three moles of steam.

C. six moles of water.

D. six moles of steam.

The correct answer is option [A].

56. The number of times the average mass of one molecule of it is heavier than one-twelfth the mass of one atom of carbon-12 is known as _____

A. relative atomic mass.

B. relative molecular mass.

C. relative molecular weight.

D. relative atomic weight.

The correct answer is option [B].

57. The molar masses of compounds in the same homologous series differ by _____

A. 4 atomic mass units.

B. 8 atomic mass units.

C. 10 atomic mass units.

D. 2 atomic mass units.

The correct answer is option [D].

TOPIC: BONDING

DIRECTION: Choose the correct answer from the lettered options.

1. Water has a rather high boiling point despite its low molecular mass because of the presence of _____

A. hydrogen bonding.

B. covalent bonding.

C. ionic bonding.

D. metallic bonding.

The correct answer is option [A].

2. The molecule having one unpaired electron is _____.

A. NO

B. CO

C. CN^-

D. O_2

The correct answer is option [A]

3. The shape of ammonia molecule is _____

A. trigonal planar.

B. octahedral.

C. square planar.

D. tetrahedral.

The correct answer is option [A].

4. Which of the following is the correct order of decreasing activity of the metals Fe, Ca, Al and Na?

A. Fe > Ca > Al > Na.

B. Na > Ca > Al > Fe.

C. Al > Fe > Na > Ca.

D. Na > Ca > Fe > Al.

The correct answer is option [D].

5. All molecules with polar bonds have dipole moment.

A. False

B. True

The correct answer is option [A].

Symmetrical molecules will have zero dipole moment.

Also If symmetrical arrangement of atoms is there, there is no dipole moment. Example CCl4.

6. The valence atomic orbitals of carbon in silver acetylide is _____.

A. sp

B. sp^2

C. sp^3

D. spd

The correct answer is option [A]

7. Two or more atoms combine to form _____

A. a molecule.

B. an anion.

C. an ion.

D. a cation.

The correct answer is option [A]

8. Inert gases do not react with any other element because _____

A. the pressure is not high enough.

B. their outermost electron level is filled with 8 electrons.

C. the temperature is not high enough.

D. their nucleus is very small.

The correct answer is option [B]

9. What is the bonding in C_2H_2?

A. ionic

B. dative

C. covalent

D. hydrogen

The correct answer is option [C]

10. The hybridization of sulphur dioxide is _____.

A. sp

B. sp^2

C. dsp^2

D. sp3

The correct answer is option [B]

11. Which of the following best describes why water has a higher boiling point than ammonia?

A. The water molecule is bigger than the ammonia molecule.

B. Water molecules have stronger dispersion forces than ammonia molecules.

C. Water molecules have dipole-dipole forces whereas ammonia molecules have dispersion forces.

D. Water molecules have stronger dipole-dipole forces than ammonia molecules.

The correct answer is option [D].

12. NaCl is an _____.

A. magnetic compound

B. ionic compound

C. hybrid compound

D. covalent compound

The correct answer is option [B]

13. _____ hybrid orbitals of nitrogen are involved in the formation of ammonium ion.

A. sp^3

B. sp

C. sp^2

D. sp^3d

The correct answer is option [A]

14. Which of the following substances is a molecular substance?

A. Aluminium.

B. Graphite.

C. CO_2.

D. Sodium chloride.

The correct answer is option [C].

15. Atoms take part in bond formation to _____

A. neutralize their charge.

B. increase their energy.

C. increase their charge density.

D. attain a stable electronic configuration.

The correct answer is option [D]

16. When N_2 goes to N_2+, the N-N bond distance _____ and when O_2 goes to O_2+, the O-O bond distance _____.

A. increases, increases

B. decreases, increases

C. decreases, decreases

D. increases, decreases

The correct answer is option [D]

17. $SnCl_2$ is nonlinear molecule?

A. True

B. False

The correct answer is option [A].

There is a lone pair in the bond. Due to repulsion between Lone pair and bonding pair, the bond angle less than 180°.

18. The bonds present in N_2O_5 are _____

A. only ionic

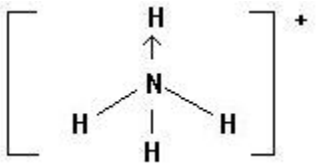
B. covalent and coordinate

C. only covalent

D. covalent and ionic

The correct answer is option [B]

19. What type of bond is indicated by the arrow in the following structure?



A. Covalent bond.

B. Ionic bond.

C. Dative bond.

D. Hydrogen bond.

The correct answer is option [C].

20. Which of the following compounds is ionic?

A. H_2O.

B. NaCl.

C. HCl.

D. CH_4.

The correct answer is option [B]

21. Metals are said to be malleable because they _____

A. are good conductors of heat.

B. are good conductors of electricity.

C. can be beaten into sheets.

D. can be alloyed.

The correct answer is option [C].

22. There are _____ p (pi) bonds in a nitrogen molecule.

A. 1

B. 3

C. 2

D. 0

The correct answer is option [C]

23. Linear overlap of two atomic p-orbitals leads to a sigma bond.

A. False

B. True

The correct answer is option [B]

24. sp^2 hybrid orbitals have equal s and p character.

A. True

B. False

The correct answer is option [B].

sp^2 hybrid use one s orbital and 2 p orbital for hydridisation. Hence sp^2 hybrid orbitals have 1/3 s character and $^2/_3$ p character.

25. Electrovalent compounds are characterized by _____

A. solubility in ethanol.

B. high molar mass.

C. high melting point.

D. strong oxidizing agent.

The correct answer is option [C].

26. On the hybridization of one s and one p orbitals, we get _____.

A. Two mutually perpendicular orbitals

B. Two orbital at 180°

C. Four orbitals directed tetrahedrally

D. Three orbital in a plane

The correct answer is option [B]

27. In P_4O_{10}, the number of oxygen atoms bonded to each phosphorus atom is _____.

A. 2

B. 4

C. 3

D. 5

The correct answer is option [B]

28. _____ and _____ are the types of bonds present in $CuSO_4.5H_2O$.

A. electrovalent and covalent

B. electrovalent and coordinate covalent

C. electrovalent, covalent and coordinate covalent

D. covalent and coordinate covalent

The correct answer is option [B]

29. In which of the following substances are dispersion forces the main intermolecular forces at room temperature?

A. Chromium.

B. Diamond.

C. Iodine.

D. Potassium chloride.

The correct answer is option [C].

30. The bond between two identical non-metal atoms has a pair of electrons _____.

A. unequally shared between the two

B. transferred fully from one atom to another

C. with identical spins

D. equally shared between them

The correct answer is option [D]

31. The hydrogen bond is strongest in _____.

A. O-H.....S

B. S-H.....O

C. F-H.....S

D. F-H...O

The correct answer is option [C]

32. A chemical bond formed by sharing of electrons is a _____

A. electrostatic bond.

B. polyatomic bond.

C. ionic bond.

D. covalent bond.

The correct answer is option [D]

33. Which of the following is not true of metals?

A. They are good conductors of electricity.

B. They ionize by electron loss.

C. Their oxides are acidic.

D. They have high melting points.

The correct answer is option [C].

Their oxides are alkaline

34. Which of the following statements is true?

A. H_2O has a greater dipole moment than H_2S.

B. H_2O is polar, but H_2S is non-polar.

C. The molecules H_2S and H_2O are both linear.

D. The molecules H_2S and H_2O both have zero dipole moment.

The correct answer is option [A].

35. In an ionic bond, the two elements _____

A. borrow electrons.

B. exchange electrons.

C. polarize electrons.

D. share electrons.

The correct answer is option [B]

36. Which of the following terms indicates the number of bonds that can be formed by an atom?

A. Oxidation number.

B. Atomic number.

C. Valence.

D. Electronegativity.

The correct answer is option [C].

37. Which of these options does not have the hydrogen bond?

A. Phenol

B. Liquid NH_3

C. Water

D. Liquid HCl

The correct answer is option [D]

38. The shape of $[CH_3]^+$ is _____.

A. coplanar

B. tetrahedral

C. linear

D. triangular planar

The correct answer is option [D]

39. How many double bonds are there in a molecule of SF_2?

A. 1

B. 2

C. 3

D. none

The correct answer is option [D].

All the bonds are single bonds as is normal for a fluorine compound

40. Element X, with electronic configuration 2,8,2 and element Y with electronic configuration 2,8,7 are likely to combine by _____

A. metallic bonding.

B. covalent bonding.

C. electrovalent bonding.

D. dative bonding.

The correct answer is option [C].

The reaction is between a metal (magnesium) and a non-metal (chlorine).

41. Dipole moment of CH_3F is greater than CH_3Cl.

A. True

B. False

The correct answer is option [B].

Bond distance is more in CH_3Cl and hence more dipole moment.

Dipole moment = charge x distance

42. Carbon tetrachloride has no net dipole moment because of _____

A. its planar structure.

B. its regular tetrahedral structure.

C. similar sizes of carbon and chlorine atoms.

D. similar electron affinities of carbon and chlorine.

The correct answer is option [B]

43. A chemical bond formed by exchange of electrons is called _____

A. an ionic bond.

B. a hydrate bond.

C. a magnetic bond.

D. a covalent bond.

The correct answer is option [A]

44. How many electrons are required in the outermost shell of an element for it to be stable?

A. 4

B. 2

C. 8

D. 6

The correct answer is option [C]

45. What is responsible for metallic bonding?

A. Sharing of electrons between the metal atoms.

B. Attraction between the atomic nuclei and cloud of electrons.

C. Transfer of electrons from one atom to another.

D. Attraction between positive and negative ions.

The correct answer is option [A].

46. Ionic crystals are crystals with repeating unit of anions and cations. Which of the following is generally true of ionic crystals?

A. They have low melting points.

B. They have high melting points.

C. Their solids are poor electrical conductors, while the liquids or solutions conduct electricity.

D. b and c only.

The correct answer is option [D].

47. There is a large temperature interval between the melting point and the boiling point of a metal because _____

A. metals have very high melting points.

B. metals conduct heat very rapidly.

C. melting does not break the metallic bond but boiling does.

D. all of the above.

The correct answer is option [A].

48. The ion that is isoelectronic (same number of electrons) with CO is _____.

A. CN^-

B. $O2^+$

C. $O2^-$

D. $N2^+$

The correct answer is option [A].

Isoelectronic means same number of electrons

49. The name of the compound with the formula KCl is _____.

A. Chloride Potassium

B. Chlorate Potassium

C. Potassium Chloride

D. Potassium Chlorate

The correct answer is option [C]

50. Which of the following types of hybridization gives rise to tetrahedral molecules?

A. sp

B. sp^2

C. sp^3

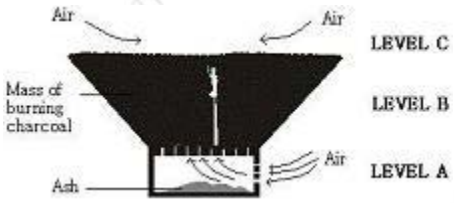
D. sp^3d

The correct answer is option [C].

TOPIC: CARBON AND ITS COMPOUNDS

DIRECTION: Choose the correct answer from the lettered options.

1. The diagram shows the stages of combustion of charcoal, the equation of reaction of level A is _____



A. $C + O_2 \rightarrow CO_2$.

B. $CO_2 + C \rightarrow 2CO$.

C. $2CO + O_2 \rightarrow 2CO_2$.

D. $CO + CO_2 \rightarrow 2CO_2$.

The correct answer is option [A].

Reason: Charcoal/ash reacts with unlimited supply of air to produce CO2.

2. One mole of a compound M(HCO3) has a mass of 162g, the relative atomic mass of M is _____.

[H = 1, C = 12, O = 16]

A. 122g.

B. 101g.

C. 53g.

D. 40g.

The correct answer is option [D].

1 mole of $M(HCO_3)_2$ = 162g

M + [(1 +12 + 10 x 3) x 2] = 162g

M + 122 = 102

M = (162 - 122)g = 40g

3. Water gas is a mixture of equal volumes of _____

A. hydrogen and carbon [IV] oxide.

B. nitrogen and carbon [II] oxide.

C. hydrogen and carbon [II] oxide.

D. nitrogen and carbon [IV] oxide.

The correct answer is option [C].

4. Where else is CO_2 found in Free State apart from the atmosphere?

A. In carbonated trees.

B. Dissolved form in water.

C. In corals.

D. In limestone region.

The correct answer is option [B].

5. Which of the following processes are used to improve the yield and quality of petrol?

(I) Cracking

(II) Catalytic reforming

(III) Use of additives

(IV) Fractional distillation

A. I & II

B. III & IV

C. I, II & III

D. I, II, III & IV

The correct answer is option [D].

6. Kipp's apparatus is an instrument for preparing intermitent supply of gases by reacting _____

A. liquid with gas.

B. liquid with solid.

C. solid with gas.

D. liquid with liquid.

The correct answer is option [B].

7. 9.60g of a gas X occupies the same volume as 0.30g of Hydrogen under the same conditions, the molar mass of X is _____.

[H = 1]

A. 8gmol-1.

B. 16gmol-1.

C. 32gmol-1.

D. 64gmol-1.

The correct answer is option [D].

8. What volume of hydrogen is produced when 2.60g of zinc reacts with excess HCl according to the following equation?

$Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$

A. 0.40dm^3.

B. 0.896$dm^{3.}$

C. 5.82$dm^{3.}$

D. 8.62$dm^{3.}$

The correct answer is option [B].

$Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$

65g of Zn produces 22.4dm3 of H^2

2.60g of Zn will produce $(^{2.6}/_{65 \times 22.4})$ = 0.896dm3

9. On exposing palm-wine to air for some days, it becomes sour owing to the conversion of _____

A. glucose to ethanol.

B. glucose to glycolic acid.

C. ethanol to ethanoic acid.

D. ethanoic acid to ethanol.

The correct answer is option [A]

This process is called fermentation. Glucose is broken down into ethanol by an enzyme called zymase which is in yeast.

10. Which carbon material is the hardest substance known?

A. Graphite.

B. Stone.

C. Diamond.

D. Anthracite.

The correct answer is option [C].

11. Producer gas is a mixture of _____

A. nitrogen and carbon [IV] oxide.

B. hydrogen and carbon [II] oxide.

C. hydrogen and carbon [IV] oxide.

D. nitrogen and carbon [IV] oxide.

The correct answer is option [D].

12. Octane number is highest in petrol containing a high proportion of _____

A. 2,2,4-trimethylpentane.

B. octane.

C. 2-methylpentane.

D. 2,4-dimethylpentane.

The correct answer is option [A].

13 The liquid product of the destructive distillation of coal is _____

A. ammoniacal liquor.

B. coal gas.

C. pyroligneous acid.

D. wood fume.

The correct answer is option [A].

14. Carbon occurs naturally as _____

A. charcoal and Soot.

B. diamond and Graphite.

C. diamond and Soot.

D. charcoal and Graphite.

The correct answer is option [B].

15. Wood → Wood charcoal + Pyroligneous acid + Wood tar + Wood gas.

Which of the following correctly represents the equation given above?

A. Destructive distillation of coal.

B. Destructive distillation of coke.

C. Destruction distillation of charcoal.

D. Destructive distillation of wood.

The correct answer is option [D].

16. A form of carbon used for absorbing poisonous gases and purification of noble gases is _____

A. wood charcoal.

B. animal charcoal.

C. carbon fibre.

D. carbon black.

The correct answer is option [A].

17. Esters are employed in the following except _____

A. making perfumes.

B. making cement.

C. making solvents for cellulose trioxonitrate (V).

D. nail varnishes

The correct answer is option [B].

18. The chemistry of carbon compounds is known as _____

A. inorganic chemistry.

B. carbon compounds.

C. organic chemistry.

D. all of the above.

The correct answer is option [C].

19. Which of these is not a reaction of combustion of charcoal?

A. $C + O_2 \rightarrow CO_2$.

B. $CO_2 + C \rightarrow CO$

C. $2CO + O2 \rightarrow 2CO_2$.

D. $CO_2 + CO \rightarrow 2CO$.

The correct answer is option [D].

20. Which of the statements is true about carbon (IV) oxide?

A. It supports combustion.

B. It is strongly acidic.

C. It is very soluble in water.

D. It supports the burning of magnesium to produce magnesium oxide.

The correct answer is option [C].

It dissolves in water to form a weak acid i.e. Trioxo Carbonate (IV) Acid

$CO_2 + H_2O \rightarrow H_2CO_3$

21. The form of carbon used in making printer's ink is _____

A. animal charcoal.

B. lampblack.

C. wood charcoal.

D. soot.

The correct answer is option [D].

22. What are the impurities present in the formation of coal?

A. Nitrogen, Calcium and Phosphorus.

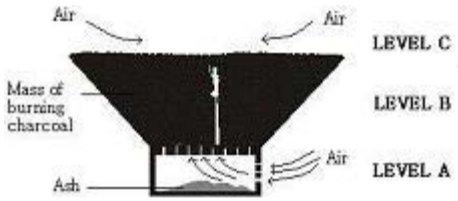
B. Nitrogen, Silicon and Phosphorus.

C. Nitrogen, Sodium and Phosphorus.

D. Nitrogen, Sulphur and Phosphorus.

The correct answer is option [D].

23. When charcoal burns in an unlimited supply of air as shown in the diagram drawn, the carbon [IV] oxide produced moves up the charcoal and burns to carbon [II] oxide, which option best explains the process?



A. Carbon [II] oxide has been reduced.

B. Carbon [IV] oxide has been reduced.

C. Carbon [IV] oxide has been oxidized.

D. All of the above.

The correct answer is option [B]. Reason: The carbon [IV] oxide reacts with charcoal/ash to produce CO which means that CO2 is reduced.

Carbon dioxide is formed in the complete combustion of a fuel. Carbon monoxide can be formed in the incomplete combustion of a fuel.

24. Which statement is true about these two gases?

A. Both gases give a milky precipitate when bubbled into limewater.

B. Carbon monoxide is an element and carbon dioxide is a compound.

C. Only carbon monoxide gas is toxic to animals.

D. Neither compound will burn in air.

The correct answer is option [C].

25. Which of the following properties of diamond is not correct?

[i] It has a high melting point.

[ii] It is very dense and resistant to high temperatures and chemical attack.

[iii] Non - conductor of electricity.

[iv] It has a density of 2.3g cm^{-3}..

A. [i] and [iii] only.

B. [iii] only.

C. [iv] only.

D. [i] and [ii] only.

The correct answer is option [C].

Reason: The density of diamond is 3.5g cm-3.

26. Destructive distillation of coal implies _____

A. heating coal in air to liberate energy for industries.

B. wasting coal by using it as a domestic source of heat.

C. heating coal in a limited supply of air.

D. heating coal with hydrogen to produce hydrocarbons.

The correct answer is option [C].

27. During fractional distillation, hydrocarbons are separated according to their _____

A. boiling points.

B. melting points.

C. triple points.

D. saturation points.

The correct answer is option [A].

Hydrocarbons and crude oil

Because hydrocarbons differ in boiling points, fractional distillation seperates the parts (fractions) of the mixture by heating the hydrocarbons in long columns until they form gases (vaporization).

28. The formula CH_2O for ethanoic acid is regarded as it's _____

A. general formula.

B. structural formula.

C. molecular formula.

D. empirical formula.

The correct answer is option [D].

29. Which of the following hydrocarbons is not likely to be present in petrol?

A. $C_{14}H_{20}$.

B. $C_{10}H_{.22}$

C. C_9H_{20}.

D. C_7H_{16}.

The correct answer is option [A].

30. Which of the following option gives the different types of coal?

A. anthracite, bituminous coal, lignite and peat.

B. anthracite, bituminous coal, coke and lignite.

C. anthracite, coke, lignite and peat.

D. anthracite, bituminous coal, coke and peat.

The correct answer is option [A].

31. Acheson process is a process of producing _____

A. graphite from coke at high temperature.

B. coke using graphite at high temperature.

C. anthracite from carbon.

D. wood-charcoal from coal.

The correct answer is option [A].

32. The liquid product of the destruction distillation of wood is _____

A. ammoniacal liquor.

B. pyroligneous acid.

C. coal fume.

D. wood gas.

The correct answer is option [B].

33. Which of the following is a property of carbon (II) oxide?

A. The gas burns with a pale blue flame forming carbon (iv) oxide.

B. It is a good reducing agent.

C. It reacts with certain metals to form carbonyls.

D. All of the above.

The correct answer is option [D].

34. The phenomenon whereby carbon atoms bonded together to form long chains or rings is known as _____

A. catenation.

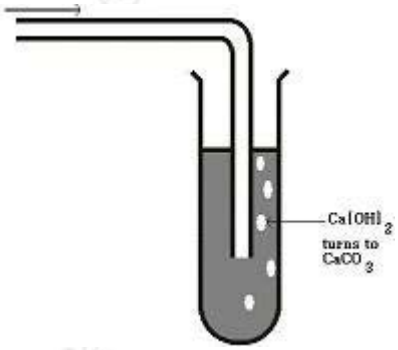
B. decarbonisation.

C. carbonisation.

D. allotropy.

The correct answer is option [A].

35. The diagram drawn is an illustration for _____



A. esting the presence of carbon [II] oxide.

B. testing the presence of calcium chloride.

C. testing the presence of carbon [IV] oxide.

D. testing the burning of carbon [II] oxide.

The correct answer is option [C].

Reason: When carbon [IV] oxide is bubbled into lime water it changes the solution to milky insoluble precipitate of calcium trioxocarbonate [IV].

36. The physical properties of carbon [IV] oxide include the following except _____

A. colourless, tasteless and odourless.

B. it changes damp litmus paper pink.

C. it is about 1.5 times denser than air.

D. it is soluble in water.

The correct answer is option [A].

Carbon [IV] oxide has a refreshing taste.

37. A homologous series is one in which _____

(I) all compounds can be represented by one general formula.

(II) successive members differ from one another by CH2.

(III) physical properties differ only in terms of the number of carbon atoms per mol.

(IV) (I) and (II)

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [C].

All the members do not have the same physical property though they may have the same chemical properties

38. Which of the following options is not a type of charcoal?

A. Wood charcoal.

B. Sugar charcoal.

C. Animal charcoal.

D. Carbon charcoal.

The correct answer is option [D].

39. Gas which dissolves in ammoniacal copper [I] chloride but is insoluble in water is _____

A. NH_3.

B. CO.

C. N_2O.

D. CO_2.

The correct answer is option [B].

40. The crystal layers of graphite are held together by _____

(I) ionic bonds.

(II) dipole bonds.

(III) electrostatic bonds

(IV) van der Waal's forces.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [B].

41. Which of these compounds is used to test the presence of carbon (IV) oxide gas?

A. CaO.

B. $Ca(OH)_2$.

C. Na_2CO_3.

D. NaOH.

The correct answer is option [B].

42. In the preparation of carbon [IV] oxide _____ is used to remove water vapour.

A. fused calcium oxide

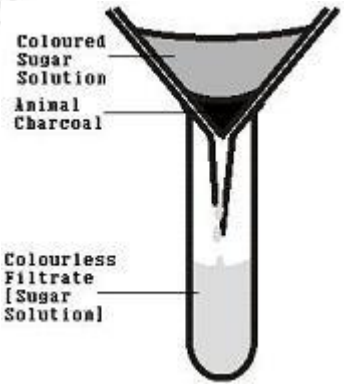
B. fused calcium hydroxide

C. fused calcium trioxocarbonate [IV]

D. fused calcium chloride

The correct answer is option [D].

43. The diagram drawn is an illustration to _____



A. investigate the ability of wood charcoal to adsorb gases.

B. study the reducing action of carbon.

C. investigate the ability of bone charcoal to adsorb colouring matter.

D. investigate the destructive distillation of wood.

The correct answer is option [C].

44. The following options are types of fuel gases except _____

A. natural gas and producer gas.

B. water gas and natural gas.

C. producer gas and water gas.

D. A and B.

The correct answer is option [C].

45. Which of the following statements about graphite and diamond is true?

A. They have the same crystal lattice structure.

B. They have the same degree of hardness.

C. They have the same electrical conductivity.

D. They can undergo the same chemical reactions.

The correct answer is option [D].

46. Which substance is most likely to be formed in the incomplete burning of fuel?

A. water

B. carbon dioxide

C. carbon monoxide

D. all of the above

The correct answer is option [C].

47. The property of graphite that makes it a good lubricant is its _____

A. low melting point.

B. low density.

C. electrical conductivity.

D. softness.

The correct answer is option [D].

48. Find the mass of $ZnSO_4$ produced when excess of $ZnCO_3$ is added to 50.0cm^3 of 4.00 $moldm^{-3}$ H_2SO_4.

The equation for the reaction is given below;

$ZnCO_3 + H_2SO_4 \rightarrow ZnSO_4 + CO_2 + H_2O$

[$ZnSO_4$ = 161gmol-1]

A. 0.200g.

B. 1.29g.

C. 32.2g.

D. 39.0g.

The correct answer is option [C].

49. Cracking is a process _____

A. in which an alkene adds on itself repeatedly to form long chain polymers.

B. in which large hydrocarbon molecules are broken into smaller units.

C. for measuring the octane number of petrol.

D. in which carbon chain results in a zig-zag arrangement.

The correct answer is option [B].

50. Cis-butanedioic acid and trans-butanedioic acid have the same _____

(I) physical properties.

(II) spatial arrangement.

(III) relative molecular mass.

(IV) functional groups.

A. I & II.

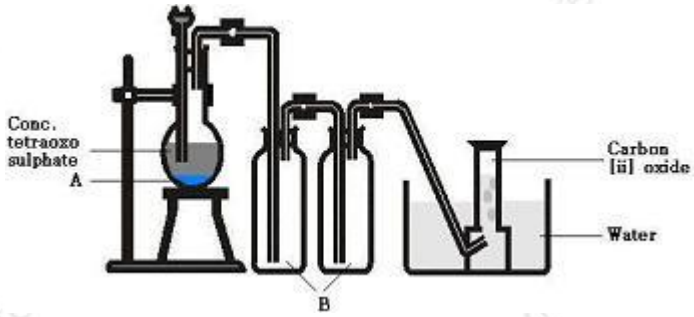
B. III & IV.

C. I, II & III.

D. I, III & IV.

The correct answer is option [D].

51. The diagram drawn is an illustration of the experiment for the _____



A. preparation of carbon (IV) oxide from ethene.

B. preparation of carbon (II) oxide from ethene.

C. preparation of carbon (IV) oxide from ethanedioic acid.

D. preparation of carbon (II) oxide from ethanedioic acid.

The correct answer is option [D].

52. The phenomenon where two or more compounds have the same molecular formular but different molecular structures is known as _____

A. hybridization.

B. isomerism.

C. allotropy.

D. isotopy.

The correct answer is option [B].

53. The constituents of water gas are _____ and _____

A. carbon (II) oxide and hydrogen.

B. carbon (II) oxide and nitrogen.

C. hydrogen and oxygen.

D. hydrogen and water vapour.

The correct answer is option [A].

54. Which of the following is suitable for determining different isotopes present in an element which exhibits isotopy?

A. Sensitive weighing balance.

B. Cathode ray tube.

C. Mass spectrometer.

D. Geiger muller counter.

The correct answer is option [C].

55. Which of the following trioxocarbonates [IV] are not decomposed by heat?

A. Calcium and sodium trioxocarbonates[IV].

B. Potassium and zinc trioxocarbonates[IV].

C. Sodium and potassium trioxocarbonates [IV].

D. Magnesium and potassium trioxocarbonates [IV].

The correct answer is option [C].

56. Which of the following gases is colourless, odourless and soluble in KOH solution?

A. CO_2.

B. HCl.

C. NH_3.

D. NO_2.

The correct answer is option [A].

57. During the preparation of carbon [ii] oxide, sodium hydroxide is used to remove _____

A. acid fumes.

B. water vapour.

C. unreacted carbon [II] oxide.

D. unchanged carbon [IV] oxide.

The correct answer is option [D].

Reason: Unchanged carbon [IV] oxide is removed when the mixture of gases through concentrated sodium hydroxide.

58. Which of the following pairs are allotropes?

(I) Water and hydrogen peroxide.

(II) Coal tar and coal gas.

(III) Diamond and graphite.

(IV) Rhombic sulphur and monoclinic sulphur.

A. I & II.

B. II, III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [D].

59. Which of the following substances is a constituent of fire extinguisher?

A. Ammonia.

B. Carbon (IV) oxide.

C. Hydrogen sulphide.

D. Nitrogen (IV) oxide.

The correct answer is option [B].

60. A gaseous metallic chloride MClx, consists of 20.22% of M by mass. The formula of the chloride is _____

[M = 27, Cl = 35.5]

A. MCl.

B. MCl_2.

C. MCl_3.

D. M_2Cl_6.

The correct answer is option [C].

Percentage mass of m = 20.22% Percentage mass of Cl = 100 - 20.22% = 79.78%

Mass ratio:

M = $^{20.22}/_{27}$ = 0.75

Cl = $^{79.78}/_{35.5}$ = 2.24

Dividing by the lowest, we have that:

M = $^{0.75}/_{0.75}$ = 1

Cl = $^{2.24}/_{0.75}$ = 2.9 approx 3

61. Producer gas is a gas with low heating power because it contains more _____

A. CO_2 than O_2.

B. Nitrogen than Carbon [II] oxide.

C. CO_2 than nitrogen.

D. Nitrogen than CO_2.

The correct answer is option [B].

Reason: Producer gas is a mixture of nitrogen and carbon [ii] oxide. It is a low heating power because it contains about 67% non-combustible nitrogen and 33% carbon [ii] oxide.

62. Gas prepared by the reaction between methane acid and concentrated tetraoxosulphate [VI] acid is _____

A. SO_2.

B. CO.

C. CO_2.

D. $H2_S$.

The correct answer is option [B].

63. When graphite is subjected to a very high temperature and pressure for several hours in the presence of catalyst nickel, the product is _____

A. soot.

B. quartz.

C. artificial diamond.

D. graphite flakes.

The correct answer is option [C].

64. What percentage of carbon [IV] oxide is found in the atmosphere?

A. 0.03%.

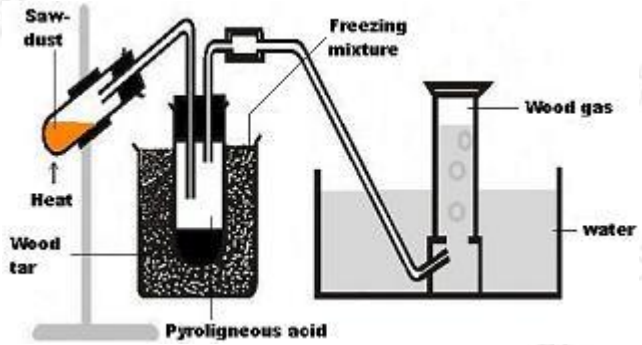
B. 0.3%.

C. 3%.

D. 0.003%.

The correct answer is option [A].

65. The diagram drawn is an illustration to _____



A. investigate the destructive distillation of wood.

B. investigate the destructive distillation of coal.

C. preparation of carbon [iv] oxide.

D. study the reducing action of carbon.

The correct answer is option [A].

66. Which of the following option is the order of the products produced during heating of coal in the absence of air?

A. Coal → Coke + Ammoniacal liquor + Coal tar + Coal gas.

B. Coal → Ammoniacal liquor + Coal tar + Coke + Coal gas.

C. Coal → Coal gas + Coal tar + Ammoniacal liquor + Coke.

D. Coal → Coke + Coal tar + Ammoniacal liquor + Coal gas.

The correct answer is option [A].

67. Water gas is a mixture of _____ and _____.

A. CO_2 and H_2

B. CO and H_2O

C. CO_2 and CO

D. CO and H_2

The correct answer is option [D].

68. Which of these pairs are synthetic and natural respectively?

A. Nylon and creatine, polyethylene and haemoglobin.

B. Polyethylene and creatine, nylon and haemoglobin.

C. Haemoglobin and nylon, creatine and polyethylene.

D. Nylon and polyethylene, creatine and haemoglobin.

The correct answer is option [D].

69. Lamp black is obtained from _____

A. coal oil.

B. vegetable oils.

C. fuel oils.

D. animal oil.

The correct answer is option [B].

70. When steam is passed over white hot coke, the products are _____ and _____

A. carbon (II) oxide and hydrogen.

B. carbon (II) oxide and nitrogen.

C. carbon (IV) oxide and hydrogen.

D. carbon (IV) oxide and nitrogen.

The correct answer is option [A].

71. Carbon occurs naturally in an impure form as _____

A. coal.

B. petroleum.

C. wood.

D. natural gases.

The correct answer is option [A].

Reason: There are two naturally occuring forms of carbon the pure form which includes diamond and graphite and the impure form which is coal. Also petroleum, wood and natural gases are combined form of carbon.

72. The heating of bituminous coal to very high temperatures in the absence of air forms _____

A. coal.

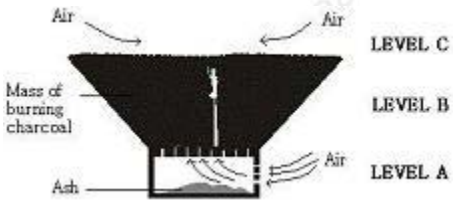
B. coke.

C. soot.

D. charcoal.

The correct answer is option [B].

73. The diagram drawn shows the stages of combustion of charcoal, the equation of reaction of level C is _____



A. $CO + CO_2 \rightarrow 2CO_2$.

B. $2CO + O_2 \rightarrow 2CO_2$.

C. $CO_2 + C \rightarrow 2CO$.

D. $C + O_2 \rightarrow CO_2$.

The correct answer is option [B].

Reason: The CO reacts with more oxygen to produce CO2.

74. Carbon black is obtained from the following options except _____

A. coal gas.

B. natural gas.

C. carbonaceous material.

D. fuel oils.

The correct answer is option [C].

75. _____ occurs naturally as plumbago, an opaque black solid.

A. Lamp black

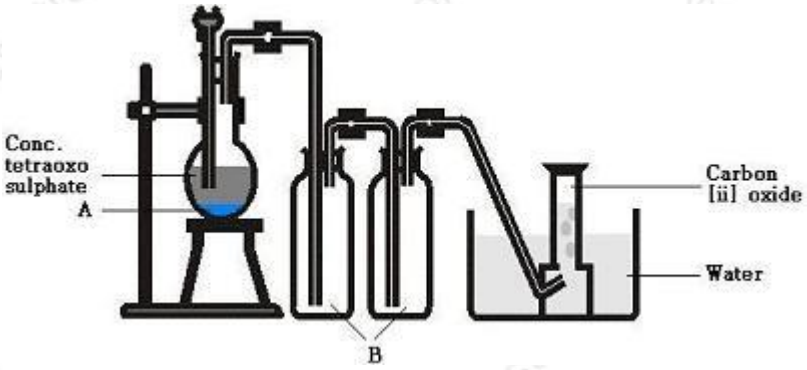
B. Animal charcoal

C. Artificial diamond

D. Graphite

The correct answer is option [D].

76. The part labelled A and B in the diagram drawn is _____



A. Ethane and conc. NaOH.

B. $CaCO_3$ and conc. NaOH.

C. Ethane-dioic acid and dilute NaOH.

D. Ethane-dioic acid and conc. NaOH.

The correct answer is option [D].

77. Which of the following is suitable for determining different isotopes present in an element which exhibits isotopy?

A. Sensitive weighing balance.

B. Cathode ray tube.

C. Mass spectrometer.

D. Geiger Muller counter.

The correct answer is option [C].

78. Which of the following represents saponification?

A. Reaction of carboxylic acids with sodium hydroxide.

B. Reaction of alkanoates with acid.

C. Reaction of carboxylic acids with alcohols.

D. Reaction of alkanoates with sodium hydroxide .

The correct answer is option [D].

Saponification is the reaction of an ester (such as a fat or oil) with alkali to produce soap.

79. **Consider the reaction below:**

Vegetable oil $\xrightarrow[\text{High temperature}]{\text{N, Ni catalyst}}$ **Product.**

This reaction is applied in the manufacture of _____

A. soapy detergent.

B. drugs.

C. paraffin wax.

D. margarine.

The correct answer is option [D].

80. Which of the following is the odd one out?

A. Diamond.

B. Graphite.

C. Bronze.

D. Coal.

The correct answer is option [C].

Reason: Diamond, graphite and coal contains carbon while bronze does not. Bronze is an alloy of copper and tin.

81. Gaseous components produced when coal is combusted include _____.

A. CO_2

B. SO_2

C. NO_x

D. all of the above

The correct answer is option [D].

TOPIC: CHEMICAL EQUILIBRIUM

DIRECTION: Choose the correct answer from the lettered options.

1. Explain the equation given below;
$A + B \rightleftharpoons C \quad \triangle H = +ve$

A. The forward reaction is exothermic.

B. The backward reaction is endothermic.

C. The forward reaction is endothermic.

D. The backward reaction is in equilibrium.

The correct answer is option [C].

2. **The effect of pressure on the reaction given below is _____**

$$H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$$

A. to encourage forward reaction.

B. to encourage backward reaction.

C. to remove the energy barrier.

D. pressure may not have any effect.

The correct answer is option [A].

3 In the reaction given,

$$N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)} \quad \triangle H = +90.4$$

which option best explains the reaction?

A. Increasing the temperature of the system will shift the equilibrium position to the right, favouring the backward reaction.

B. Lowering the temperature of the system will shift the equilibrium position to the right, favouring the forward reaction.

C. Increasing the temperature of the system will shift the equilibrium position to the left, favouring the forward reaction.

D. Increasing the temperature of the system will shift the equilibrium position to the right, favouring the forward reaction.

The correct answer is option [D].

4. The pH value of iron (III) chloride solution is likely to be _____

A. 3.

B. 7.

C. 9.

D. 11.

The correct answer is option [C].

5. **In the reaction;**

$$SO_{2(g)} + O_{2(g)} \overset{V_2O_5}{\rightleftharpoons} SO_{3(g)}$$

The use of double arrows shows _____.

A. the reaction is in physical equilibrium.

B. contact process.

C. the reaction involves both forward and backward reactions.

D. the reaction is the rate determining step.

The correct answer is option [C].

6. In which of the following cases will a decrease in pressure and an increase in temperature shift the equilibrium position to the right?

A. $X_{2(g)} + Y_{2(g)} \rightleftharpoons Z_{2(g)}$ H is -ve

B. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 2Z_{2(g)}$ H is -ve

C. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 3Z_{2(g)}$ H is +ve

D. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 3Z_{2(g)} H$ is -ve

The correct answer is option [C].

7 The equilibrium constant K, of this reaction is _____.

$${}_xZ + {}_bQ \rightleftharpoons {}_tM + {}_nR$$

A. $K = \frac{[Z]^x[Q]^b}{[M]^t[R]^n}$

B. $K = \frac{[M]^t[R]^n}{[Z]^x[Q]^b}$

C. $K = \frac{[Q]^b[M]^t}{[Z]^x[R]^n}$

D. $K = \frac{[t]^M[n]^R}{[x]^Z[Q]^b}$

The correct answer is option [B].

8. In a reaction given,

$$3Fe_{(s)} + 4H_2O_{(g)} \rightleftharpoons Fe_3O_{4(s)} + 4H_{2(g)}$$

an increase in the concentration will cause _____

A. increase in the forward reaction.

B. decrease in the backward reaction.

C. increase in the backward reaction.

D. decrease in the forward reaction.

The correct answer is option [A].

9. In which of the following reactions is Le' Chatelier's principle applied?

A. Endothermic.

B. Exothermic.

C. Redox.

D. Reversible.

The correct answer is option [D].

10. **Write down the expression for the equilibrium constant for given reaction,**

$CO_{(g)} + 2H_{2(g)} \rightleftharpoons CH_3OH_{(g)}$

where K_c and K_p is used depending on whether it is easier to measure concentrations pressures

A. $K_p = \frac{[H_2]^4}{[CO][CH_3OH]}$

B. $K_c = \frac{[CO]}{[H_2]^2[CH_3OH]}$

C. $K_p = \frac{[CO][H_2]^2}{[CH_3OH]}$

D. $K_p = \frac{[CO][H_2]^2}{[CH_3OH]}$

The correct answer is option [D].

11. Calculate the pH of a 0.001 m acid solution.

A. 5.

B. 3.

C. 4.

D. 2.

The correct answer is option [B].

Solution: pH = -log $[H^+]$

where H^+ = 0.001 m, pH = -log [0.001] = 3.

12. Catalysts are important in the chemical industry because _____

A. they affect the purity of the products.

B. they affect the quantity of the products.

C. they increase the time for reacting equilibrium.

D. bond breaking is slowed down.

The correct answer is option [C].

13. A solution which resists changes in pH when a small amount of an acid or a base is added to it is known as a/an _____ solution.

A. acidic

B. basic

C. buffer

D. neutral

The correct answer is option [C].

14. What is the name of the scientist who defined acid as 'a proton donor while base is a proton acceptor'?

A. Lewis.

B. Le-Chatelier

C. Arrhenius.

D. Bronsted-Lowry.

The correct answer is option [D].

15. The following are factors affecting equilibrium reactions with the exception of _____

A. pressure (for solid systems).

B. concentration.

C. temperature.

D. pressure (for gaseous systems).

The correct answer is option [A].

16. A reversible reaction is _____

A. a dynamic equilibrium when the forward reaction is occurring at a rate which produces no net change in the concentrations of the reactants or products in an open system.

B. a dynamic equilibrium when the backward reaction is occurring at a rate which produces a net change in the concentrations of the reactants or products in a closed system.

C. a static equilibrium when both the forward and backward reactions are occurring at the same rate, thereby producing no net change in the concentrations of the reactants or products in a closed system.

D. a dynamic equilibrium when both the forward and backward reactions are occurring at the same rate, thereby producing no net change in the concentrations of the reactants or products in a closed system.

The correct answer is option [D].

17. $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

at 298K, $K_p = 834$, what will be the temperature at an equilibrium constant $K_p = 194$ given the enthalpy change for the reaction as $-1181.61\ J\ mol^{-1}$.
[Take $R = 8.314\ J\ K^{-1}mol^{-1}$]

A. -144.8 K.

B. 144.8 K.

C. 73.44 K.

D. -73.44 K.

The correct answer is option [C].

Solution: $\ln[K_1/K_2] = \Delta H\theta/R \times [T_1 - T_2/T1T2]$
where $K_p = 834$, $T_1 = 298$ K, $K_p = 194$, $T_2 = ?$, $\Delta H^\theta = -1181.61$ J mol^{-1}, $R = 8.314$ J K^{-1} mol^{-1}
Therefore, $T_2 = 73.44$ K.

18. A molecular orbital can accommodate only _____

A. one electron.

B. two electron.

C. four electron.

D. eight electron.

The correct answer is option [B].

19. **Given the following equilibrium mixture of gases at $500^{o}C$ where ΔH is negative,**

$$2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)}$$

What will be the effect of cooling below $100^{o}C$?

A. forward reaction is favoured.

B. there is no change in the reaction.

C. backward reaction is favoured.

D. none of the above.

The correct answer is option [A].

20. A solution which resists changes in pH on dilution or addition of small amounts of acids or alkalis is known as _____

A. buffer.

B. acid-base titrations.

C. pH scale.

D. Arrhenius theory.

The correct answer is option [A].

21. A dynamic equilibrium whereby there is a balance change in the constituent substances in a reaction is called _____

A. physical equilibrium.

B. reversible equlibrium.

C. chemical equilibrium.

D. none of the above.

The correct answer is option [C].

22. **The following equilibrium is established in a closed vessel.**

$A_{(g)} + B_{(g)} \rightleftharpoons 3C_{(g)} + D_{(g)}$ **ΔH is negative**

Which would increase the yield of C?

A. Increasing the temperature.

B. Decreasing the pressure on the reacting mixture.

C. Adding a positive catalyst.

D. Removing some D.

The correct answer is option [D].

23. When temperature increases in an endothermic reaction, the equilibrium constant _____

A. decreases.

B. is the same.

C. increases.

D. none of the above.

The correct answer is option [C].

24. Which of the following are conditions upon which an irreversible reaction is dependent?

[i] The temperature of the reacting system.

[ii] The pressure of the reacting system (for gases).

[iii] The concentration of the reacting system.

A. [ii] and [iii].

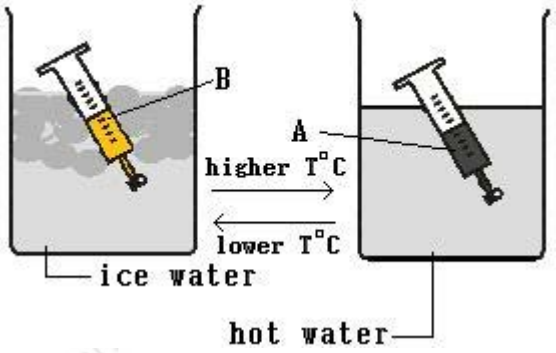
B. [iii] only.

C. [i], [ii] and [iii].

D. [i] and [iii].

The correct answer is option [C].

25. From the diagram drawn, the part labelled A is _____



A. pale yellow [more N_2O_4].

B. brown [more NO2].

C. pale yellow [less N_2O_4].

D. brown [less NO2].

The correct answer is option [B].

26. **Given the following equilibrium mixture of gases at 500°C where ΔH is negative,**

$$2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)}$$

What will be the effect of adding a catalyst?

A. backward reaction is favoured.

B. there is no change in the reaction.

C. forward reaction is favoured.

D. all of the above.

The correct answer is option [B].

27. A solution of potassium chloride is _____

A. unionized.

B. neutral.

C. alkaline.

D. acidic.

The correct answer is option [B].

28. Which of the following best expresses the mathematical relationship between standard electrode potential and equilibrium constant?

A. $E^{\theta} = {}^{RT\ln K}/_{nF}$.

B. $E^{\theta} = .{}^{RTF}/_{n \times \ln K}$.

C. $E^{\theta} = {}^{Rn \times \ln K}/_{TF}$.

D. $E^{\theta} = {}^{FT\ln K}/_{nR}$.

The correct answer is option [A].

29. $N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$

In the endothermic reaction above, more product will be formed by _____

A. a constant volume.

B. a decrease in pressure.

C. a decrease in temperature.

D. a decrease in volume.

The correct answer is option [B].

30. When temperature increases in an exothermic reaction, the equilibrium constant _____

A. decreases.

B. increases.

C. is the same.

D. all of the above.

The correct answer is option [A].

31. A reaction that proceeds in both directions under suitable conditions is called a _____

A. reversible reaction.

B. chemical reaction.

C. physical reaction.

D. irreversible reaction.

The correct answer is option [A].

32. The law of 'mass action' as postulated by Guldberg and Waage, states that _____

A. at constant pressure, the rate of reaction is proportional to the active masses of each of the reaction.

B. at constant temperature, the rate of reaction is proportional to the active masses of each of the reaction.

C. at constant temperature, the rate of reaction is inversely proportional to the active masses of each of the reaction.

D. at constant pressure, the rate of reaction is inversely proportional to the active masses of each of the reaction.

The correct answer is option [B].

33. **In the decomposition of**

The reaction will attain dynamic equilibrium only when _____

A. the reaction is in open system.

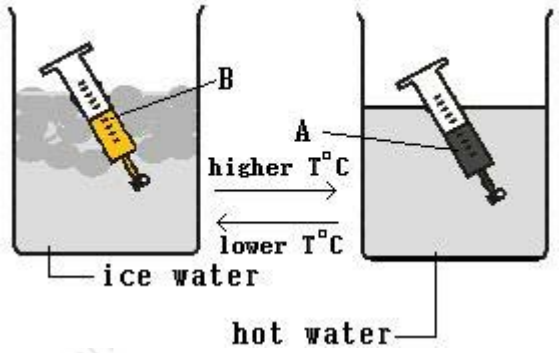
B. the reaction is heated strongly.

C. the reaction is in a closed system.

D. the reaction is catalysed.

The correct answer is option [C].

34. From the diagram drawn, the part labelled B is _____



A. brown [more NO2].

B. pale yellow [less N2O4].

C. pale yellow [more N2O4].

D. brown [less NO2].

The correct answer is option [C].

35. Which of the following reactions has no suitable indicator?

A. $Ca(OH)_{2(aq)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + H_2O_{(l)}$.

B. $NaOH_{(aq)} + CH_3COOH_{(aq)} \rightarrow CH_3COONa_{(aq)} + H_2O_{(l)}$.

C. $NaOH_{(aq)} + HCl_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)}$.

D. $NH_{(4)}OH_{(aq)} + CH_3COOH \rightarrow CH_3COONH_{4(aq)} + H_2O_{(l)}$.

The correct answer is option [D].

36. Calculate the hydroxide ion concentration of a solution whose pH is 2.4.

A. $2.5 \times 10^{-2.}$

B. $2.5 \times 10^{-21.}$

C. $2.5 \times 10^{-12.}$

D. 2.5×10^{-10}.

The correct answer is option [C].

Solution: pOH = - log $[OH^-]$

where pOH = 14 - pH = 14 - 2.4 = 11.6; OH- = anti-log [-11.6] = 2.5×10^{-12}.

37. **In the reaction given,**

$$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)} \quad \triangle H = -90.4$$

which of the following correctly favours the forward reaction?
[i] Increase pressure
[ii] Increase temperature
[iii] Decrease temperature

A. [i] and [iii].

B. [i] and [ii].

C. [ii] and [iii]

D. [iii] only.

The correct answer is option [A].

38. The mathematical equation for calculating the equilibrium constant is given as _____

A. $\ln K = {}^{\Delta H\theta}/_{R} \times [{}^{1}/_{T}]$.

B. $\ln K = {}^{\Delta H\theta}/_{T} \times [{}^{1}/_{R}]$.

C. $\ln \Delta H^{\theta} = {}^{K}/_{R} \times [{}^{1}/_{T}]$.

D. $\ln K = {}^{R}/_{\Delta H^{\theta}} \times [{}^{1}/_{T}]$.

The correct answer is option [A].
Solution: $\ln[{}^{K_1}/_{K2}] = {}^{\Delta H\theta}/_{R} \times [{}^{T_1 - T_2}/_{T1T2}]$.

39. Le′ Chatelier's principle states that _____

A. if an external constraint such as a change in temperature, pressure or concentration, is imposed on a chemical system in equilibrium, the equilibrium will shift so as to annul or neutralize the constraint.

B. If an internal constraint such as a change in heat content, enthalpy change, is imposed on a chemical system in equilibrium, the equilibrium will shift so as to annul or neutralize the constraint.

C. if an external constraint such as a change in pressure, volume, is imposed on a physical system in equilibrium, the equilibrium will shift so as to annul or neutralize the constraint.

D. If an internal constraint such as a change heat content, enthalpy change, is imposed on a physical system in equilibrium, the equilibrium will shift so as to annul or neutralize the constraint.

The correct answer is option [A].

40. **For the reaction given below;**

The equilibrium constant has the value 10^{-16} atm^{-1} at 298K. The value of $\Delta H\theta$ is +131.3KJ mol^{-1}, calculate the value of the equillibrium constant at 1000 K?

[Take R = 8.314 JK^{-1} mol^{-1}]

A. 10-16 atm-1.

B. 1.04 x 10-16 atm-1.

C. 1.40 x 10-16 atm-1.

D. 1.44 atm-1.

The correct answer is option [B].
Solution: $\ln[K_1/K_2] = \Delta H\theta/R \times [T_1 - T_2/T1T2]$, where $K_1 = 10^{-16} atm^{-1}$, $T_1 = 298$ K, $T_2 = 1000$ K, R = 8.314 J K^{-1} mol^{-1}, ΔH^{θ} = +131.3kJ mol^{-1}, the values in the above equation $K_2 = 1.435$ atm^{-1} ≈ = 1.44 atm^{-1}.

41. Which of the following options is a condition for considering pressure in an equilibrium system?

A. There must be concentration gradient between the reactants and the products.

B. The reactants could be gases while the products may be solids.

C. Both products and reactants must be gaseous.

D. The reaction takes place in a closed system.

The correct answer is option [B].

42. In which of the following cases will an increase in pressure and a decrease in temperature shift the equilibrium position to the right?

A. $X_{2(g)} + Y_{2(g)} \rightleftharpoons Z_{2(g)}$ H is -ve

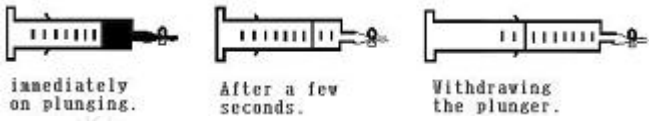
B. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 3Z_{2(g)}$ H is +ve

C. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 2Z_{2(g)}$ H is +ve

D. $X_{2(g)} + Y_{2(g)} \rightleftharpoons 3Z_{2(g)}$ H is -ve

The correct answer is option [A].

43. The diagram drawn is an illustration to study _____



A. the effect of high pressure on the$N_2O_4 \rightleftharpoons 2NO$

B. the effect of temperature on the. $N_2O_4 \rightleftharpoons 2NO_2$.

C. the effect of concentration on the $N_2O_4 \rightleftharpoons 2NO_2$.

D. the effect of catalyst on the. $N_2O_4 \rightleftharpoons 2NO_2$.

The correct answer is option [A].

44. From $E^{\theta} = \frac{RT \ln K}{nF}$, where E^{θ} is the standard electrode potential of a reaction, increasing the value of K will _____

A. increase the forward reaction.

B. increase the backward reaction.

C. decrease the forward reaction.

D. decrease the backward reaction.

The correct answer is option [A].

45. Which of the following is a factor that affects equilibrium constant?

(i) Temperature.

(ii) Pressure.

(iii) Concentration.

(iv) Catalyst

A. (i) and (ii) only.

B. (i) only.

C. (i), (ii), (iii) and (iv).

D. (ii) and (iii) only.

The correct answer is option [B].

Solution: Temperature is the only factor that affects equilibrium constant while the others do not change the equilibrium constant.

46. Two boys steadily balanced in a sea-saw game is an example of _____

A. static equilibrium.

B. dynamic equilibrium.

C. homogeneous equilibrium.

D. mutual equilibrium.

The correct answer is option [A].

47. **For the reaction given below;**

$$H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$$

at 298K, K_p = 794, and at 500K, K_p = 160. Is the enthalpy change for the reaction endothermic or exothermic, calculate the value of $\Delta H\theta$?
[Take R = 8.314 JK $^{-1}$ mol $^{-1}$]

A. -1181.61 J mol-1.

B. -1181.16 J mol-1.

C. -1811.61 J mol-1.

D. -1118.61 J mol-1.

The correct answer is option [A].

Solution: $\ln[K_1/K_2] = \Delta H^\theta/R \times [T_1 - T_2/T_1T_2]$, where $K_1 = 794$, $K_2 = 160$, $T_1 = 298$ K, $T_2 = 500$ K, $R = 8.314$ J K^{-1} mol^{-1}. Therefore, $\Delta H^\theta = -1181.61$ J mol^{-1}.

48. **Consider the equilibrium reaction represented by the following equation:**
$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$; $\Delta H = 395.7\ kJmol^{-1}$
Which of the following statements about the equilibrium system is correct?

A. Addition of catalyst changes the equilibrium position.

B. Decrease in pressure increases the yield of SO3.

C. Decrease in pressure increases the equilibrium concentration of O2.

D. Increase in temperature favours the forward reaction.

The correct answer is option [D].

49. **Given the following equilibrium mixture of gases at 500^oC where ΔH is negative,**

$$2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)}$$

What will be the effect of increasing the temperature?

A. the forward reaction is favoured.

B. the reaction is in equilibrium.

C. the backward reaction is favoured.

D. all of the above.

The correct answer is option [C].

50. **Given the following equilibrium mixture of gases at 500°C where ΔHis negative.**

$$2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)}$$

What will be the effect of adding more O_2 at constant pressure?

A. more CO_2 is produced.

B. less CO_2 is produced.

C. the same CO_2 is produced.

D. more CO is produced.

The correct answer is option [A].

51. **What happens if the temperature of this system is decreased?**

$$SO_{2(g)} + O_{2(g)} \rightleftharpoons SO_{3(g)}$$

$$E^{\theta} = \frac{RT\ In\ K}{nF}. \Delta H = xKJ\ mol^{-1}$$

A. The reaction favours backward reaction.

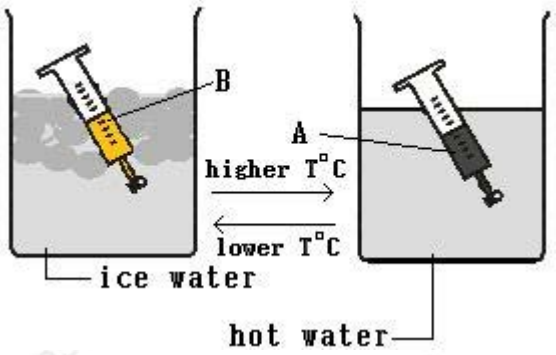
B. The reaction attains equilibrium fast.

C. The reaction favours forward reaction.

D. The reaction favours both forward and backward reactions.

The correct answer is option [C].

52. The diagram drawn is an illustration to study the _____



A. effect of pressure change on the equilibrium of dinitrogen (IV) oxide and nitrogen (IV) oxide.

B. effect of volume change on the equilibrium of dinitrogen (IV) oxide and nitrogen (IV) oxide.

C. effect of temperature change on the equilibrium of dinitrogen (IV) oxide and nitrogen (IV) oxide.

D. effect of concentration change on the equilibrium of dinitrogen (IV) oxide and nitrogen (IV) oxide.

The correct answer is option [C].

53. In most equilibrium reactions, catalysts are not required because _____

A. catalyst reduces the energy barrier.

B. most catalyst are easily poisoned when wrongly chosen.

C. catalyst favours both forward and backward reactions.

D. catalyst could be positive or negative.

The correct answer is option [C].

54. **In the reaction given below, what effect has conc. H_2SO_4 on the equilibrium?**

$$CH_3COOH + C_2H_5OH \underset{}{\overset{\text{conc.}H_2SO_4}{\rightleftharpoons}} CH_3COOC_2H_5 + H_2O$$

A. To acidify the system.

B. To encourage backward reaction.

C. To encourage forward reaction.

D. To produce more CH3COOH.

The correct answer is option [C].

55. Given the following equilibrium mixture of gases at 500oC where ΔH is negative,

$2CO(g) + O2(g) \leftrightarrow 2CO2(g)$,

what will be the effect of doubling the pressure at 200oC?

A. There is no change in the reaction.

B. Backward reaction is favoured.

C. Forward reaction is favoured

D. None of the above.

The correct answer is option [C].

TOPIC: ENERGY AND CHEMICAL REACTIONS

DIRECTION: Choose the correct answer from the lettered options.

1. The energy spent on disorganizing the regular structure of ions in a molecule is called _____

A. hydration energy.

B. lattice energy.

C. ionization energy.

D. electron affinity.

The correct answer is option [B].

2. The second law of thermodynamics states that _____

A. a spontaneous process occurs only if there is a decrease in the entropy of a system and its surroundings.

B. a spontaneous process occurs only if the entropy of a system and its surroundings is zero.

C. a spontaneous process occurs only if there is an increase in the entropy of a system and its surroundings.

D. a spontaneous process occurs only if there is an increase in the enthalpy of a system and its surroundings.

The correct answer is option [C].

3. The heat of reaction does not depend on _____

A. mass of reactants.

B. temperature and pressure.

C. physical state of the substance involved.

D. the quantity of heat.

The correct answer is option [D].

4. Which word would you associate with the phrase 'reaction that gives out heat'?

A. Endothermic.

B. Reactive.

C. Fuel.

D. Exothermic.

The correct answer is option [D].

5. To calculate the enthalpy or energy change for a reaction the following are recorded except _____

A. temperature change.

B. pressure change.

C. mass of reactants.

D. specific heat capacity of the reaction mixture.

The correct answer is option [B].

6. A measure of the degree of disorderliness in a chemical system is known as the _____

A. activation energy.

B. enthalpy.

C. entropy.

D. energy of dissolution.

The correct answer is option [C]

7. The change in internal energy ΔU of an endothermic system is mathematically expressed as _____

A. $\Delta U = \Delta H + p\Delta V$.

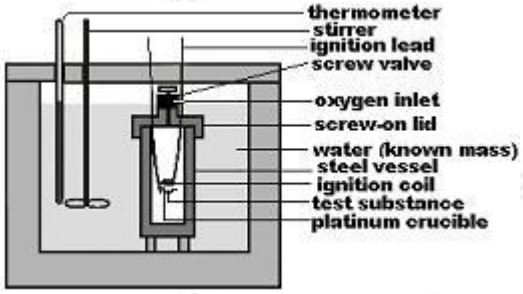
B. $\Delta U = \Delta H - q\Delta V$.

C. $\Delta U = \Delta H - p\Delta V$.

D. $\Delta U = \Delta H - q\Delta V$.

The correct answer is option [A].

8. The diagram drawn is used to determine _____



A. heat of neutralization.

B. heat of combustion.

C. heat of solution.

D. heat of formation.

The correct answer is option [B].

9. Which of these processes is endothermic?

A. Slaking of quicklime.

B. Formation of ammonia.

C. Combustion of graphite.

D. Dissolution of potassium trioxonitrate [v] in water.

The correct answer is option [C].

10. $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}, \Delta H = 180.6KJ\ mol^{-1}$

In the reaction above, increase in temperature will _____

A. increase the quantity of N2.

B. increase the yield of NO.

C. decrease the yield of NO.

D. decrease the quantity of O2.

The correct answer is option [B].

11. What is the heat of neutralization or heat energy when 100cm3 of 0.5M hydrochloric acid reacts with 100cm3 of 0.5M sodium trioxocarbonate, the temperature of reaction mixture and the total mass of reaction mixture is assumed to be 3.4K and 200g?

[Hint: Assume that specific heat capacity of reaction mixture = specific heat capacity of pure water = 4.2J g-1 K-1]

A. 57.1KJ.

B. 75.1KJ.

C. 141.24KJ.

D. 114.24KJ.

The correct answer is option [D].

Solution: Heat evolved = mcθ
where m = 200g, c = 4.2J g^{-1} K^{-1}, θ = 3.4K
Heat elvolved = 200 x 4.2 x 3.4 = 2856J
From the equation of reaction
Na_2CO_3 + 2HCl → 2NaCl + H_2O + CO_2;2 moles of HCl yields 1 mole H_2O
100cm^3 of 0.5 hydrochloric acid contain $^{100 \times 0.5}/_{1000}$ = 0.05 mole of acid
100cm^3 of 0.5M Na_2CO_3 contains 0.025 moles of alkali from the equation of reaction.0.5 moles of acid will react with 0.025 mole alkali to produce 0.025 mole of water. The production of 0.025 mole water evolves 2856J heat energy. The production of 1 mole water evolves $^{2856}/_{0.025}$ = 114240J = 114.24KJ heat energy.

12. The determination of heat of combustion is carried out with _____

A. a thermometer.

B. a bomb calorimeter.

C. an evapourating dish.

D. a boiling tube.

The correct answer is option [B].

13. The dehydration of ethanol gives ethene, calculate the approximate heat of reaction given the bond energies.

[C-C = 347KJ/mol, C-H = 414KJ/mol, H-O = 464KJ/mol, C-O = 360KJ/mol, C=C = 611KJ/mol

A. -974KJ.

B. -146KJ.

C. 974KJ.

D. 146KJ.

The correct answer is option [C].

Solution: Equation of Reaction: C2H5OH →H2SO4→ C2H4

1 mole of C-C bonds broken = +347KJ/mol

1 mole of C-H bonds broken = +414 x 5 = +2070KJ/mol

1 mole of C-O bonds broken = +360KJ/mol; 1 mole of O-H bonds broken = +464KJ/mol; Total bonds broken = +3241KJ; 1 mole of C=C bonds formed = -611KJ/mol; 1 mole of C-H bonds formed = -414 x 4 = -1656KJ/mol; Total bonds formed = -2267KJ/mol; Heat of reaction of 1 mole = +3241KJ -2267KJ = +974KJ.

14. Calculate the approximate heat of reaction of the following reaction with its bond energy values

[bond energy of C-C = 347 KJ mol-1, C-H = 414KJ mol-1, O-O = 498KJ mol-1, C=O = 736KJ mol-1, O-H = 464KJ mol-1].

The equation of reaction is C3H6(g) + 9/2O2(g) → 3CO2(g) + 3H2O(g).

A. +1,990KJ.

B. -2,337KJ.

C. -1,990KJ.

D. -2,140KJ.

The correct answer is option [C].

Solution: From the equation of reaction C3H6(g) + 9/2O2(g) → 3CO2(g) + 3H2O(g);1 mole of C-C bonds broken = 1 x +347 = +347KJ mol-1;1 mole of C-H bonds broken = 1 x +414 = +414KJ mol-1;9/2 mole of O-O bonds broken = 9/2 x +498 = 2241KJ mol-1;3 moles of H-O-H bonds formed = 3 x -464 + 3 x -464 = -1392 - 1392 = - 2784KJ mol-1;3 moles of C=O bonds formed = 3 x -736 = -2208KJ mol-1;ΔHreaction = total energy required + total energy evolved = -2208 - 2784 + 347 + 414 + 2241 = -1,990KJ.

15. The energy given out when the free ions are hydrated by water molecules is _____

A. crystal energy.

B. hydration energy.

C. activation energy.

D. lattice energy.

The correct answer is option [B].

16. $NH_{3(g)} + HCl_{(g)} \rightarrow NH_4Cl_{(s)}$ ΔH

The entropy change in the system above is _____.

A. negative.

B. indeterminate.

C. positive.

D. zero.

The correct answer is option [B].

17. Heat content of matter is sometimes called _____

A. entropy.

B. joule.

C. enthalpy.

D. energy

The correct answer is option [C].

18. _____ is the heat absorbed in decomposing a compound equal to the heat evolved in its formation under the same conditions .

A. Conservation of heat.

B. Conservation of mass.

C. Conservation of energy.

D. Conservation of matter.

The correct answer is option [C].

19. The amount of heat needed to raise the temperature of one kilogram of water by 1oC is called _____

A. kilojoule.

B. kilocalorie.

C. kilowatt.

D. calorie.

The correct answer is option [B].

20. What does ΔH represent in the equation below?

$H_2(g) + 1/2O_2(g)$

→ $H_2O(g)$ $\Delta H = -242$ KJ mol-1

A. Activation energy.

B. Dissociation energy.

C. Heat of formation.

D. Heat of neutralization.

The correct answer is option [C].

21. Which of the following options presents decrease in entropy?

A. Melting of ice.

B. Decomposition of calcium hydrogen trioxocarbonate [iv].

C. Addition of cold water to starch solutions.

D. Addition of hot water to starch solution.

The correct answer is option [C].

22. The entropy and enthalpy of a system are a measure of the _____

A. degree of disorderliness and heat content respectively.

B. heat content and degree of disorderliness respectively.

C. heat content of a system only.

D. degree of disorderliness only.

The correct answer is option [A].

23. Reactive substances have _____

A. equal energy bonds.

B. no energy bonds.

C. low energy bonds.

D. high energy bonds.

The correct answer is option [C].

24. Stable substances have _____

A. low energy bonds.

B. high energy bonds.

C. no energy bonds.

D. equal energy bonds.

The correct answer is option [B].

25. The internal energy, U, of a chemical system is equal to the sum of _____

A. chemical energy and bond energy.

B. hydration energy and bond energy.

C. hydration energy and lattice energy.

D. lattice energy and bond energy.

The correct answer is option [A].

26. Which word would you associate with the phrase 'a substance that releases energy on burning'?

A. Endothermic.

B. Reactive.

C. Fuel.

D. Exothermic.

The correct answer is option [C].

27. The free energy of a chemical system is expressed as _____

A. -ΔStotal.

B. +TΔStotal.

C. -TΔStotal.

D. ΔStotal.

The correct answer is option [C].

The free energy ΔG = ΔH - TΔStotal, if the enthalpy change is zero then ΔG = -TΔStotal.

28. Which of the following statements are correct of DH, the enthalpy of reaction?

(I) The heat change accompanying a chemical reaction.

(II) Negative for an exothermic reaction.

(III) Positive for endothermic reaction.

(IV) All of the above.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [D].

29. The term used when the total heat content of the products is less than that of the reactants is _____

A. exothermic.

B. endothermic.

C. thermothermic.

D. absorption energy.

The correct answer is option [A].

30. Find the ΔH of a chemical system when the entropy is 218.2J K-1 mol-1 and the temperature is 100oC.

A. 81,388.6J q-1.

B. 40,694.3J q-1.

C. 122,082.9J q-1.

D. 132,082.9J q-1.

The correct answer is option [A].

Solution: ΔS = ΔH/T, where ΔS = change in entropy, ΔH = change in enthalpy, T = Temperature in kelvin;ΔH = ΔS x T = 218.2 x [100 + 273] = 81,388.6J q-1.

31. Energy Changes in chemical reactions are due to _____

A. the catalyst used in the reaction.

B. the type of bond.

C. heat.

D. the forming and breaking of bonds.

The correct answer is option [D].

32. The amount of heat evolved or absorbed when a substance is formed is known as _____

A. heat of combustion.

B. heat of formation.

C. standard heat of solution.

D. heat of solution.

The correct answer is option [B].

33. From the 1st law of thermodynamics ΔU = q + w. How is this equation given for gaseous system?

A. ΔU = q + wv.

B. ΔU = zero.

C. ΔU = q + Pv.

D. ΔU = q + PΔv.

The correct answer is option [D].

34. Calculate q when a system does 72J of work and its internal energy decreases by 90J.

A. +18J.

B. -162J.

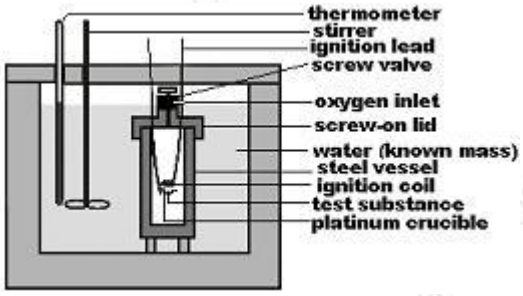
C. +162J.

D. -18J.

The correct answer is option [D].

Solution: ΔU = q + w, where ΔU = -90J, w = -72J, q = ?;-90 = q - 72; q = -90 + 72 = -18J.

35. The diagram drawn is a device called _____



A. calorimeter.

B. combustion calorimeter.

C. bomb calorimeter.

D. iron calorimeter.

The correct answer is option [C].

36. Heat content difference between the products and reactants of a chemical reaction is called _____

A. entropy change.

B. endothermic reaction.

C. exothermic reaction.

D. enthalpy change.

The correct answer is option [D].

37. Entropy is defined as _____

A. a measure of the degree of order or stability of a substance at high temperature.

B. a measure of the degree of perfect order of a substance at low temperature.

C. the degree of disorder or randomness of a substance at low temperature.

D. a measure of the degree of disorder or randomness of a substance at high temperature.

The correct answer is option [D].

38. In a chemical reaction the energy observed in the form of _____

[i] heat.

[ii] light and heat.

[iii] sound and heat.

A. [i]&[ii] only.

B. [ii] only.

C. [i], [ii]&[iii].

D. [iii] only.

The correct answer is option [C].

39. A _____ is not a definition of an endothermic reaction.

A. reaction in which heat is absorbed.

B. reaction in which heat is released.

C. reaction in which ΔH = positive

D. reaction in which the energy of the product is higher than energy of the reactant.

The correct answer is option [B].

40. The following options determine the spontaneity of a chemical system except _____

A. enthalpy change.

B. chemical equilibrium.

C. entropy.

D. free energy.

The correct answer is option [B].

41. The amount of heat absorbed or evolved when one mole of a substance is dissolved in so much water that further dilution results in detectable heat change is known as _____

A. standard heat of solution.

B. heat of dilution.

C. heat of formation.

D. standard heat of dilution.

The correct answer is option [A].

42. The amount of heat evolved when one mole of a substance is burned completely in oxygen is known as _____

A. heat of solution.

B. standard heat of solution.

C. heat of formation.

D. heat of combustion.

The correct answer is option [D].

43. The following are precautions taken when measuring heat of combustion of a specimen except _____

A. the use of well lagged calorimeter.

B. use of volumes of water but continuously stirred.

C. both water and the bomb must attain steady temperatures before igniting the bomb.

D. tempeartures of the ignited bomb is taken every 30 second interval until a steady temperature is attained.

The correct answer is option [C].

44. When the bond breaking energy, is greater than bond forming energy it is called _____

A. heat of reaction.

B. exothermic reaction.

C. endothermic reaction.

D. all of the above.

The correct answer is option [C].

45. Which of the following decreases in a system when vapour condenses to a liquid?

A. Activation energy.

B. Enthalpy.

C. Entropy.

D. Number of molecules..

The correct answer is option [C].

46. Which of the following is true of an endothermic reaction?

A. Enthalpy change is negative.

B. Heat energy is absorbed.

C. A catalyst is required.

D. Activation energy is high.

The correct answer is option [B].

47. From the equation of reaction given below;

it can be inferred that _____

$2H_2O_{(l)} \rightarrow 2H_{2(g)} + O_{2(g)}$ $\Delta H = 285.58KJ/mol$

A. 285.58 kilojoules of energy was absorbed from the surroundings.

B. 285.58 kilojoules of energy was released into the surroundings.

C. 285.58 is the entropy energy change of the reaction.

D. none of the above.

The correct answer is option [A].

48. For a given chemical reaction, the overall heat change of dissolution is endothermic if the _____

A. lattice energy is equal to the hydration energy.

B. lattice energy and hydration energy zero.

C. lattice energy is less than the hydration energy.

D. lattice energy is greater than the hydration energy.

The correct answer is option [D].

49. When a molecule is homonuclear with higher bond energy it is _____

A. less difficult to break.

B. does not break.

C. more difficult to break.

D. needs low-energy to break.

The correct answer is option [C].

50. Find ΔS for the conversion of one mole of liquid water at 150oC, given that the heat of vaporization of water is 2260.87KJ Kg-1.

A. 96.20J/K/mol.

B. 182.50J/K/mol.

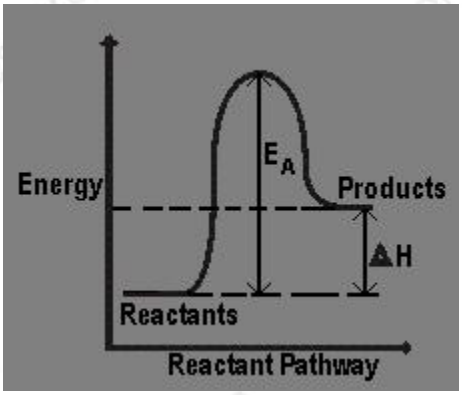
C. 271.30J/K/mol.

D. 149.10J/K/mol.

The correct answer is option [A].

Solution: Mass of 1 mole of water = 18g equivalent to 0.018kg;Heat of vaporization of 1 mole of water = 2260.87KJ x 0.018 = 40,695.70J;ΔS = ΔH/T, where ΔH = 40,695.70J, T = 150 + 273 = 423K;ΔS = 96.2J/K/mol.

51. The diagram drawn illustrates the energy profile for _____



A. exothermic reaction.

B. endothermic reaction.

C. heat of formation.

D. heat of reaction.

The correct answer is option [B].

52. The change in internal energy ΔU of an exothermic system is mathematically expressed as _____

A. ΔU = ΔH + pΔV.

B. ΔU = ΔH - pΔV.

C. ΔU = -ΔH + pΔV.

D. ΔU = -ΔH - pΔV.

The correct answer is option [D].

53. An endothermic reaction is _____

A. one during which heat is liberated to the surroundings.

B. one during which energy is not required to form chemical bonds.

C. one during which energy is required to form chemical bonds.

D. one during which heat is absorbed from the surroundings.

The correct answer is option [D].

54. [A]: OH-(aq) + H+(aq) → H2O(l)

[B]: 2OH-(aq) + 2H+(aq) → 2H2O(l);

From reactions A and B above, if the ΔH of A = -57.3KJ/mol. Then the ΔH of B is _____

A. -57.3/2KJ/mol.

B. -57.3 x 2KJ/mol.

C. (-57.3)2KJ/mol.

D. 2(-57.3)2KJ/mol.

The correct answer is option [B].

55. An exothermic reaction is _____

A. one during which heat is liberated to the surroundings.

B. one during which heat is absorbed from the surroundings.

C. one during which energy is not required to break chemical bonds.

D. one during which energy is required to break chemical bonds.

The correct answer is option [A].

56. In a chemical reaction, the reacting elements possess energy of motion known as _____

A. potential energy.

B. free energy.

C. bond energy.

D. kinetic energy.

The correct answer is option [D].

57. What is the arrangement of the following salts in the order of their sensitivity to light?

A. AgI > AgCl > AgBr.

B. AgCl > AgI > AgBr.

C. AgBr > AgCl > AgI.

D. AgCl > AgBr > AgI.

The correct answer is option [D].

58. The average amount of energy associated with making or breaking 1 mole of a particular bond in its gaseous state is called _____

A. dissociation energy.

B. bond energy.

C. reaction energy.

D. none of the above.

The correct answer is option [B].

59. Calculate Δs in JK-1mol-1 for the conversion of one mole of liquid water to vapour at 100oC, given that the heat of vaporisation of water = 2260.87Jg-1.

A. 99.7.

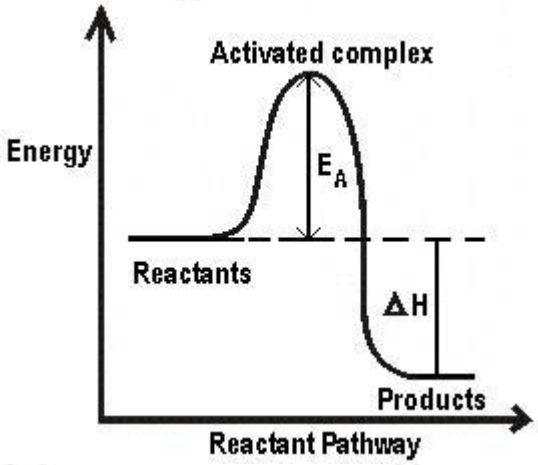
B. 100.7.

C. 109.1.

D. 110.0.

The correct answer is option [C].

60. The diagram drawn illustrates the energy profile for _____



A. exothermic reaction.

B. endothermic reaction.

C. heat of combustion.

D. heat of reaction.

The correct answer is option [A].

61. If ΔG (free energy) is used to determine spontaneity of a chemical reaction, what is the nature of the reaction of ΔG = zero?

A. The reaction is static.

B. The reaction is exothermic.

C. The reaction is endothermic.

D. The reaction is at equilibrium.

The correct answer is option [D].

62. Substances which dissolve endothermically would dissolve more at _____

A. lower temperature.

B. any temperature provided not below freezing point.

C. higher temperature.

D. any isolated temperature.

The correct answer is option [C].

63. A solute with a positive heat of solution has _____

A. great solubility.

B. no solubility.

C. less solubility.

D. solubility to be equilibrium with solvent.

The correct answer is option [C].

64. The heat evolved when a substance is dissolved in water is known as the _____

A. heat of formation.

B. heat of combustion.

C. heat of solution.

D. standard heat of solution.

The correct answer is option [C].

65. Which of the following is a condition for a spontaneous reaction?

A. ΔH - T is zero.

B. ΔH - TΔS is positive.

C. ΔH - T

ΔS is negative.

D. ΔS is zero.

The correct answer is option [C].

66 The heat of formation of one mole of ionic crystal compound from widely separated gaseous ions under standard conditions is known as _____

A. bond energy.

B. crystal energy.

C. hydration energy.

D. lattice energy.

The correct answer is option [D].

67. The amount of heat evolved or observed when a chemical reaction occurs between molar quantities of the substances as represented in the equation of reaction is known as _____

A. heat of reaction.

B. standard heat of reaction.

C. heat content.

D. All of the above.

The correct answer is option [B].

68. The amount of heat absorbed or evolved when a concentrated solution is diluted is called _____

A. heat of solution.

B. heat of dilution.

C. heat of combustion.

D. heat of formation.

The correct answer is option [B].

69. The notation $\Delta H f^{\ominus}$ represents _____

A. enthalpy change of formation.

B. heat change of formation.

C. standard heat change of formation.

D. standard enthalpy of formation.

The correct answer is option [C].

70. The heat accompanying the reaction represented by the equation $H_2O(l) \rightarrow H_2O(g)$ is described as the heat of _____

A. solution.

B. neutralization.

C. vapourization.

D. sublimation.

The correct answer is option [C].

71. The energy needed to split up crystals by water molecules into free ions is known as _____

A. activation energy.

B. crystal energy.

C. hydration energy.

D. lattice energy.

The correct answer is option [D].

72. The thermodynamics law that states that energy may be converted from one form to another but it cannot be created or destroyed is known as the _____

A. First law.

B. Fourth law.

C. Third law.

D. Second law.

The correct answer is option [A].

73. The energy barrier that must be overcome before a reaction can occur is called _____

A. chemical energy.

B. activation power.

C. activation energy.

D. heat energy.

The correct answer is option [C].

74. Hess's law of constant heat summation states that _____

A. the total enthalpy change of a chemical reaction is different regardless of the route by which the chemical change occurs, provided that the conditions at the start of a reaction are diferent as the final condition.

B. the route by which a chemical change occurs gives a constant total enthalpy change, provided the initial and final conditions are different.

C. the route by which a chemical change occurs gives a constant total enthalpy change, provided the initial and final conditions of the chemical reactions are the same.

D. the route by which a chemical change occurs gives a constant total enthalpy change, provided there are no initial and final conditions of the chemical reactions.

The correct answer is option [C].

75. From the equation given below:

$\Delta G = \Delta H - T\Delta S$,

this will make ΔG negative except _____

A. decreasing the temperature.

B. decreasing the enthalpy change.

C. increasing the temperature.

D. making ΔH and $T\Delta S$ equal.

The correct answer is option [D].

76. Welding converts _____

A. electric energy to heat energy.

B. electric energy to light energy.

C. electric energy to both heat and light energies.

D. chemical energy to heat energy.

The correct answer is option [C].

77. If the change in free energy (ΔG) of a reaction is positive, it can be deduced that the reaction will

(I) not proceed in the direction indicated.

(II) not be spontaneous.

(III) not occur at room temperature.

(IV) be feasible.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [A].

TOPIC: GENERAL CHEMISTRY

DIRECTION: Choose the correct answer from the lettered options.

1. The products of electrolysis of dilute sodium chloride solution with platinum electrodes are _____ and _____

A. hydrogen, oxygen.

B. oxygen, chlorine.

C. chlorine, water.

D. sodium amalgam, chlorine.

The correct answer is option [A].

2. A concentrated solution containing H+, Cu2+, OH− and Cl− was electrolyzed using platinum electrodes. Which of the ions will be discharged at the cathode?

A. H-.

B. Cu2+.

C. OH-.

D. Cl-.

The correct answer is option [B].

3. Which of the following fractions of crude oil is likely to contain the hydrocarbon C12H26?

A. Kerosene.

B. Naptha.

C. Gas oil.

D. Fuel oil.

The correct answer is option [A].

Kerosine contains C10 - C16 carbon atoms per molecule.

4. Which of the following features of a human skeleton can be determined by carbon-dating?

A. Height.

B. Mass.

C. Age.

D. Race.

The correct answer is option [C].

5. If 10 cm3 of distilled water is added to 10 cm3 of an aqueous salt solution, the concentration of the solution _____

A. increases.

B. decreases.

C. remains constant.

D. doubles.

The correct answer is option [B].

6. An increase in the pressure of a gas results in a decrease in it's _____

A. mass.

B. vapour density.

C. volume.

D. temperature.

The correct answer is option [C].

This is in line with Boyle's law V a 1/P

7. Which of the following polymers contains nitrogen?

A. Nylon.

B. Polyvinyl chloride.

C. Polyethene.

D. Cellulose.

The correct answer is option [A].

8. In linear molecules, the bond angle is _____

A. 90°.

B. 104°.

C. 120°.

D. 180°.

The correct answer is option [D].

9. Given that the electronic configuration of an element X is$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$, it can be deduced that X _____

A. belongs to group 0 in the periodic table.

B. belongs to period 4 in the periodic table.

C. contains 3 unpaired electrons in the ground state.

D. has 6 electrons in its outermost shell.

The correct answer is option [A].

10. Which of the following statements is correct about the reaction represented in the equation below?

$A_2(g) + B_2(g) \rightarrow 2AB(g)$; DH = + x kJmol-1.

A. The forward reaction is exothermic.

B. The reaction goes to completion at equilibrium.

C. Pressure has no effect on the equilibrium mixture.

D. At equilibrium, increase in temperature favours the reverse reaction.

The correct answer is option [C].

11. Which of the following ions will migrate to the cathode during electrolysis?

A. Zinc ions.

B. Chloride ions.

C. Sulphide ions.

D. Tetraoxosulphate (VI) ions.

The correct answer is option [A].

Zinc ions are cations.

12. What would be the formula of the compound if the element Al reacts with an atom of an element X which has six electrons in its outermost shell?

[Al = 13]

A. AlX_2.

B. Al_2X.

C. Al_2X_2.

D. Al_2X_3.

The correct answer is option [D].

13. Elements which belong to the same group in the periodic table are characterized by the _____

A. difference of +1 in the oxidation numbers of successive members.

B. presence of the same number of outermost electrons in the respective atoms.

C. difference of 14 atomic mass units between successive members.

D. presence of the same number of electron shells in the respective atoms.

The correct answer is option [B].

14. P, Q, R and S are metals in the same group in the periodic table in periods 3, 4, 5 and 6 respectively. Which of them loses electrons least readily?

A. P.

B. Q.

C. R.

D. S.

The correct answer is option [D].

15. The shapes of CO_2, H_2O and CH_4 respectively are_____, _____ and _____

A. bent, linear and tetrahedral.

B. bent, tetrahedral and linear.

C. linear, bent and tetrahedral.

D. tetrahedral, linear and bent.

The correct answer is option [C].

16. The position of equilibrium in a reversible reaction is affected by _____

A. particle size of the reactants.

B. change in concentration of the reactants.

C. change in size of the reaction vessel.

D. vigorous stirring of the reaction mixture.

The correct answer is option [B].

17. Hydrogenation of butene yields _____

A. butyne.

B. butane.

C. pentene.

D. butanol .

The correct answer is option [B].

$C_4H_8 + H_2 \rightarrow C_4H_{10}$

18. If X reacts with excess acidified $K_2Cr_2O_7$ to produce an alkanoic acid, X is _____

A. an alkanol.

B. an alkene.

C. an amino acid.

D. an alkanone.

The correct answer is option [A].

19. A mixture of calcium chloride and calcium trioxocarbonate (IV) in water can be separated by _____

A. evaporation.

B. sublimation.

C. distillation.

D. filtration.

The correct answer is option [D].

20. What is the oxidation number of Z in K_3ZCl_6?

A. -3.

B. +3.

C. -6.

D. +6.

The correct answer is option [B].

$K_3+ZCl_6- = 0$

+3 + Z + (- 6) = 0

Z = 6-3

Z = +3

21. Which of the following establishments uses the process of fermentation in it's operations?

A. Fertilizer plant.

B. Textile industry.

C. Brewery.

D. Soap manufacturing industry.

The correct answer is option [C].

22. Given that the order of reactivity of four metals is P > Q > R > S, which of the following reactions is feasible?

A. S + P+→ P + S+.

B. Q + S+ → S + Q+.

C. R + P+ → P + R+.

D. S + Q+ → Q + S+ .

The correct answer is option [B].

23. What is the most probable group of an element, which is a soft silvery white solid and reacts violently with water?

A. Group 0.

B. Group 1.

C. Group 4.

D. Group 6.

The correct answer is option [B].

24. Which of the following compounds is readily soluble in water?

A. CuO.

B. AgCl.

C. Na2SO4.

D. CaCO3.

The correct answer is option [C].

All metallic sulphate (tetraoxo sulphate (VI) are soluble except BaSO4 and CaSO4

25. If the atomic number of an element X is 11 and that of nitrogen is 7, the most likely formula of the nitride of X is _____

A. X3N.

B. XN3.

C. X3N2.

D. N2X.

The correct answer is option [A].

26. Ethene undergoes mainly addition reactions because it is _____

A. a gas.

B. a hydrocarbon.

C. unsaturated.

D. easily polymerized.

The correct answer is option [C].

27. Which of the following without effervescence, would dissolve in warm dilute H_2SO_4 to give a blue solution?

A. Copper turnings.

B. Copper (II) trioxocarbonate (IV).

C. Copper (II) oxide.

D. Copper alloy.

The correct answer is option [C].

28. Benzene produces more sooth than ethene on burning because benzene _____

A. has a higher molar mass.

B. has a higher degree of unsaturation.

C. undergoes both substitution and addition reactions.

D. is a liquid at room temperature.

The correct answer is option [A].

29. In which of the reactions presented by the following equations is HNO3 behaving as a typical acid?

A. $CaO + 2HNO_3 \rightarrow Ca(NO_3)_2 + H_2O$.

B. $Cu + 4HNO_3 \rightarrow Cu(NO_3)_2 + 2H_2O + 2NO_2$.

C. $S + 6HNO_3 \rightarrow H_2SO_4 + 6NO_2 + 2H_2O$.

D. $P + 5HNO_3 \rightarrow H_3PO_4 + 5NO_2 + H_2O$.

The correct answer is option [A].

Acids combine with base to form salt and water only.

30. Allotropes of an element differ in their _____

A. physical properties.

B. chemical properties.

C. mass numbers.

D. electronic configuration.

The correct answer is option [B].

Allotropes is the ability of an element to exist in more than one form in the same physical state.

31. Hydrogen is used in oxy-hydrogen flames for melting metals because it _____

A. evolves a lot of heat when burnt.

B. combines explosively with oxygen.

C. is a very light gas.

D. is a rocket fuel.

The correct answer is option [B].

32. What does ΔH represent in the equation given below?

$Cl(g) + e^- \rightarrow Cl^-(g)$; DH = - 363 kJmol-1?

A. Ionization energy.

B. Electron affinity.

C. Dissociation energy.

D. Heat of atomization.

The correct answer is option [D].

33. Which of the following constitutes an advantage in the use of hard water?

A. Formation of scum with soap.

B. Furring of kettles.

C. Blockage of water pipes.

D. Formation of strong bones.

The correct answer is option [D].

34. Potassium vapour burns with a _____

A. blue flame.

B. brick-red flame.

C. violet flame.

D. golden-yellow flame.

The correct answer is option [C].

35. What is oxidized in the reaction represented by the following equation

$3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$

A. Oxygen.

B. Hydrogen.

C. Nitrogen.

D. Copper.

The correct answer is option [D].

36. What is the oxidation number of nitrogen in Al(NO3)3?

A. +1.

B. +3.

C. +5.

D. +6.

The correct answer is option [C].

Al(NO3)3 = +3 + 3N + (-6 x 3)

= +3 + 3N - 18

= +3N - 15

= 15/3

= 5 N = +5.

37. A sheet of paper is placed in the path of a beam from a radioactive source. The emissions that pass through the paper consist of _____

A. alpha particles and gamma rays.

B. alpha and beta particles.

C. beta particles and gamma rays.

D. alpha particles only.

The correct answer is option [C].

Beta and Gamma particles have high penetrating power.

38. What quantity of electrons (in mole) is lost when one mole of iron (II) ions is oxidized to iron?

A. 4 mole.

B. 3 mole.

C. 2 mole.

D. 1 mole.

The correct answer is option [D].

39. A common characteristic shared by iron and aluminium is that both _____

A. are extracted by reduction method.

B. form only basic oxides.

C. show oxidation states of +2 and +3.

D. form soluble hydroxides.

The correct answer is option [A].

40. A sodium atom and a sodium ion have the same _____

A. number of neutrons.

B. number of electrons.

C. electric charge.

D. electronic structure.

The correct answer is option [A].

This is because the Neutrons are not tampered with during ionization.

41. Which of the following pairs of reagents react to produce hydrogen?

A. Zinc and concentrated trioxonitrate (V) acid.

B. Water and calcium dicarbide.

C. Copper and dilute hydrochloric acid.

D. Magnesium and dilute tetraoxosulphate (VI) acid.

The correct answer is option [D]

$2Mg + 2H_2SO_4 \rightarrow 2MgSO_4 + 2H_2$

42. Sugars can be hydrolysed at room temperature by the action of _____

A. mineral acids.

B. strong bases.

C. enzymes.

D. oxidants.

The correct answer is option [A].

43. What can be deduced from the equation given below?

$Ag^+(aq) + Cl^-(aq) \rightarrow Ag^+Cl^-(s)$; DH = - 65.7 kJmol-1.

A. Direct combination is involved and the reaction is endothermic.

B. A solid is formed and heat is evolved.

C. Activation energy is high and a catalyst is required.

D. The reaction is endothermic and occurs at high temperature.

The correct answer is option [B].

Endothermic reaction is one in which heat is absorbed from the environment.

44. **What is the function of H_2SO_4 in the following reaction?**

$$C_{12}H_{22}O_{11} \xrightarrow{\text{conc. } H_2SO_4} 12C + 11H_2O$$

A. Oxidizing agent.

B. Strong acid.

C. Dehydrating agent.

D. Catalyst.

The correct answer is option [C].

45. Which of the following compounds is covalent?

A. $CaCl_2$.

B. MgO.

C. NaH.

D. CH_4.

The correct answer is option [D].

Covalent bond is a force holding atoms together in molecules formed by sharing two electrons between two atoms.

46. What is the value of X in the following equation?

$MnO_4^- + 4H^+ + Xe^- \rightarrow MnO_2 + 2H_2O$

A. 2.

B. 3.

C. 4.

D. 7.

The correct answer is option [B].

47. The metal that liberates hydrogen from cold water in bubbles only is _____.

A. Ca

B. Na

C. Al

D. K

The correct answer is option [B].

It is highly reactive.

48. A gas that is not associated with global warming is _____.

A. CO_2

B. SO_3

C. CH_4

D. H_2

The correct answer is option [D].

49. Which of the following reactions represents the change that occurs when a photographic film is exposed to sunlight?

A. Ag → Ag+ + e−.

B. Ag+ + e- → Ag.

C. 2Ag + Br2 → 2AgBr.

D. Ag+ + Br− → AgBr.

The correct answer is option [B].

50. If the value of ΔH for a reaction is negative, it means that the reaction is _____

A. slow.

B. exothermic.

C. spontaneous.

D. irreversible.

The correct answer is option [B].

An exothermic reaction is one in which heat is evolved to the environment and DH is always negative.

51. In the electrolysis of $CuSO_4(aq)$ using copper electrodes, the reaction at the anodes is _____

A. discharge of SO_4^{2-} .

B. discharge of OH^-.

C. dissolution of copper electrode.

D. evolution of energy.

The correct answer is option [B].

52. Which of the following is a physical change?

A. Exposing white phosphorus to air.

B. Dissolving calcium in water.

C. Freezing ice-cream.

D. Burning kerosine.

The correct answer is option [C].

53. The presence of unpaired electrons in an atom of a transition metal gives rise to _____

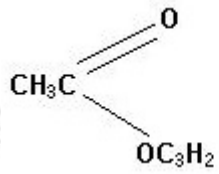
A. para magnetism.

B. malleability.

C. ductility.

D. shiny appearance.

The correct answer is option [A].

54.  is a/an _____.

A. tertiary alkanol.

B. alkanone.

C. alkanoic acid.

D. alkanoate.

The correct answer is option [D].

55. Which of the following substances decomposes when an electric current is passed through it?

A. Glucose solution.

B. Zinc rod.

C. Hydrochloric acid.

D. Tetrachloromethane.

The correct answer is option [C].

56. One of the products of combustion of pentane in excess air is _____

A. pentanol.

B. pentene.

C. nitrogen (II) oxide.

D. carbon (IV) oxide.

The correct answer is option [D].

57. The most important use of hydrogen is in the _____

A. hydrogenation of oils.

B. manufacture of methyl alcohol.

C. manufacture of ammonia.

D. manufacture of ethyl alcohol.

The correct answer is option [A].

58. The main type of reaction that occurs in the blast furnace during the extraction of iron is _____

A. reduction reaction.

B. decomposition.

C. exothermic reaction.

D. combustion.

The correct answer is option [A].

59. How many unpaired electrons are there in an atom of an element with the following electronic configuration,

1s22s22p6?

A. 0.

B. 1.

C. 2.

D. 6.

The correct answer is option [A].

60. Which substance could be a fuel in the future?

A. Hydrogen.

B. Carbon.

C. Carbon monoxide.

D. Oxygen.

The correct answer is option [A].

TOPIC: INTRODUCTION TO CHEMISTRY

DIRECTION: Choose the correct answer from the lettered options.

1. The difference between chemical law and chemical hypothesis is _____

A. chemical law is explicit while hypothesis is not.

B. chemical law is a statement made by a scientist while hypothesis is a reasonable explanation to an observation made.

C. chemical law is a statement which confirms the hypothesis after an experiment while hypothesis is a reasonable explanation to an observation.

D. chemical law is concise while hypothesis is not.

The correct answer is option [C].

2. Chemical hypothesis is different from chemical law in that _____.

A. hypothesis is not reasonable while law is reasonable

B. hypothesis is a reasonable explanation to observations made while law is a statement from a scientist

C. hypothesis is a reasonable explanation to observations while law is a statement which confirms the hypothesis after extensive tests.

D. none of the above

The correct answer is option [C]

3. The first step of the scientific method involves _____.

A. forming a hypothesis

B. making observations

C. performing an experiment

D. predicting the result of an experiment

The correct answer is option [B].

4. Which of these is not a chemical change?

A. Rusting

B. Sublimation of solids

C. Saking of quicklime

D. Fermentation of glucose

The correct answer is option [B]

5. The following except _____, are professions in chemistry.

A. philosophers

B. miners

C. geologists

D. engineers

The correct answer is option [A].

6. From the options given below, pick the odd one out.

A. Cooking.

B. Oil and margarine.

C. Hair cream and perfume.

D. Soaps and detergent.

The correct answer is option [A]

Options B-D are products from a chemical reaction while A is a chemical reaction.

7. Separation of mixtures of solids with various sizes include _____.

A. magnetic separation

B. coarsing

C. sublimation

D. sieving

The correct answer is option [D]

8. Which of these requires crystallization most?

A. Drug making

B. Cement making

C. Paint making

D. Perfume making

The correct answer is option [A]

9. Which of the following option is the odd one out?

A. Air

B. Urine

C. Brass

D. Sand

The correct answer is option [D]

10 _____ is established only after the theory has been extensively tested and proven true without any exception.

A. Scientific law

B. Theory

C. Hypothesis

D. Observation

The correct answer is option [A]

11. A pattern or relationship that has been established based on a large amount of experimental data is a _____

A. theory.

B. hypothesis.

C. law.

D. decree

E. framework

The correct answer is option [C].

12. Fractional crystallization is a method of separating _____.

A. crude oil

B. liquid - liquid mixture

C. coal

D. solids of different solubilities in a liquid

The correct answer is option [D]

13. Chemistry can be defined as _____

A. a branch of knowledge which produces chemicals.

B. a branch of science which makes physics and biology clearer.

C. the oldest branch of science.

D. the branch of science which deals with changes in matter.

E. none of the above

The correct answer is option [D].

14. Which of the following is most correct?

A. You can reject or accept a hypothesis, but never prove it to be true

B. You can prove a hypothesis to be true

C. You can prove a hypothesis to be false

D. Accepting or rejecting a hypothesis is the same as proving whether or not the hypothesis is true

The correct answer is option [A].

15. In paper and gas chromatography respectively, the common feature between them is that they have _____.

A. solid phase and moving phase

B. stationary phase and moving phase

C. long phase and stationary phase

D. chromatic phase and stationary phase

The correct answer is option [B]

16. A chemist is a _____.

A. scientist who is trained in the field of chemical changes of the environment

B. scientist who is trained in the field of polymerisation

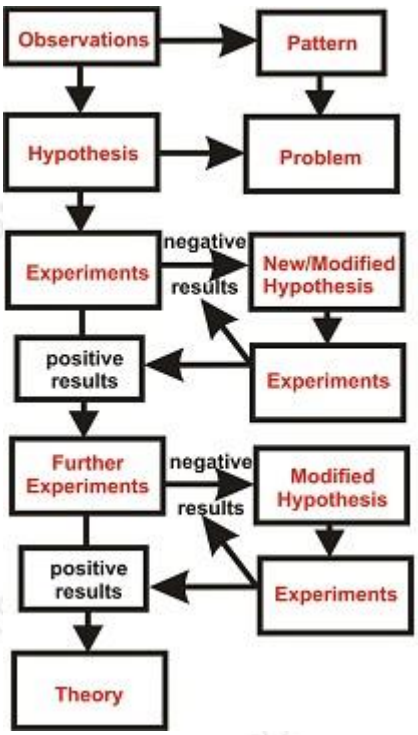
C. scientist who is trained in the field of chemistry

D. scientist who is trained in the field of chemical energy

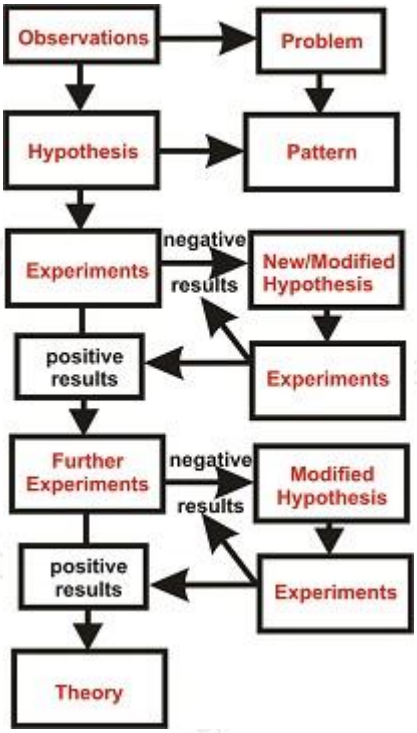
The correct answer is option [C]

17. Which of the following option best illustrates the scientific method?

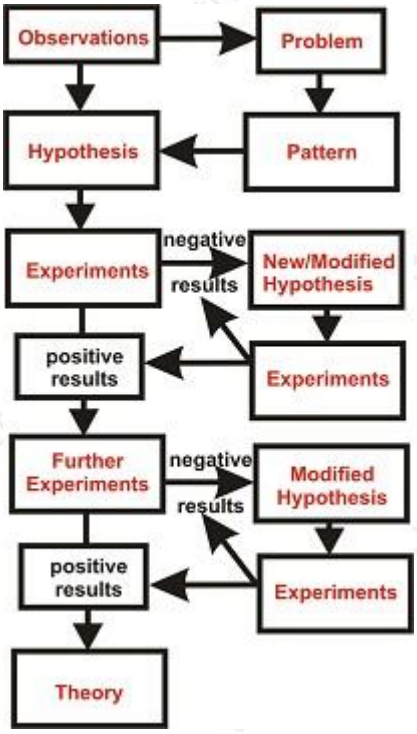
A.



B.

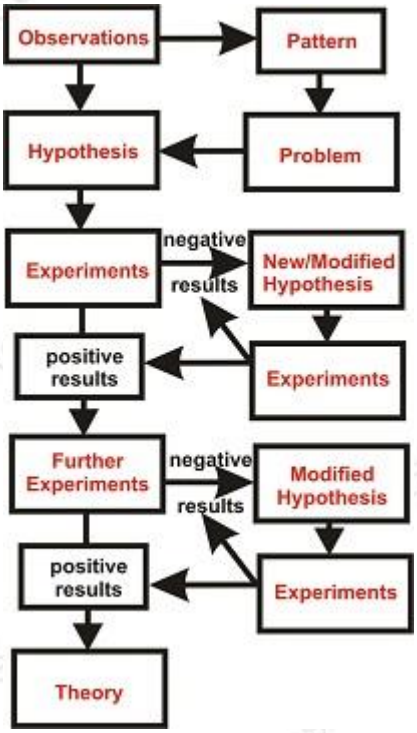


C.



Author: www.teststreams.com

D.



The correct answer is option [B]

18. If your hypothesis is rejected, which is true?

A. Your experiment may well have been a success! After all, you were probably testing the null hypothesis.

B. Your hypothesis is rejected, then your experiment was poorly designed.

C. The null hypothesis never works.

D. All of the above.

The correct answer is option [A].

19. Scientific approach to discoveries follows the order, _____, _____ and _____

A. observation, hypothesis, and experiments.

B. experiments, hypothesis, and results.

C. results, experiment, and observation.

D. theory, results, and experiments.

The correct answer is option [A].

20. The following are chemical changes except _____

A. rusting of iron.

B. fading of coloured clothes.

C. dilution of salt in water

D. decomposing of green leaves.

E. hydrogenation of vegetable oil

The correct answer is option [C].

21. From the options given below, pick the odd one out.

A. Rusting

B. Burning firewood

C. Rotting leaves

D. Plastics

The correct answer is option [D].

Options A-C are examples of chemical changes while option D is a product of a chemical change.

22. The method adopted in the separation of lead II chloride from water is _____.

A. sieving

B. decantation

C. crystallization

D. distillation

The correct answer is option [B]

23. The way of studying a problem is known as _____.

A. experiments

B. scientific principle

C. scientific method

D. test

The correct answer is option [C]

24. Which of these professions has no need for chemistry?

A. Miners

B. Engineers

C. Philosophers

D. Geologists

The correct answer is option [C]

25. Separation of different carotenes from carrot root uses a method of _____.

A. chromatography

B. carotinization

C. distillation

D. centrifugation

The correct answer is option [A]

26. Chemical changes around us include the following options with the exception of _____.

A. rusting of iron nails

B. fading of coloured cloth

C. sieving

D. decomposing of green leaves in a compost

The correct answer is option [C]

27. If the result of an experiment turn out differently from what you expected, then _____

A. the experiment is a faliure.

B. you should explore the possible reason for this in the 'conclusions' section of your experimental write-up.

C. you need to re-do your experiment untill you get the expected result.

D. you didn't follow the scientific method.

The correct answer is option [B].

28. _____ is a well-substantiated explanation of an aspect of the natural world.

A. A theory

B. A law

C. An hypothesis

D. An experiment

E. A research

The correct answer is option [A].

29. All except one is not a popular criteria for purity;

A. melting point

B. boiling point

C. temperature

D. centrifugation

The correct answer is option [D]

30. If you have a control for your experiment, which of the following is true?

A. There can be more than one difference between the control group and the test groups, but not several difference or else the experiment is invalid

B. Tthe control and the test groups may have several differences between them

C. The control group is identical to each test group except for one variable

D. The test group is always the same with the control group

The correct answer is option [C].

TOPIC: KINETIC THEORY OF MATTER. GAS LAWS

DIRECTION: Choose the correct answer from the lettered options.

1. If 380cm3 of hydrogen diffuses in 19 seconds, how long will it take 560cm3 of a gas, Y, whose vapour density is 25 to diffuse under the same conditions?

[Relative molecular mass of hydrogen = 2g/mol]

A. 95 seconds.

B. 29.5 seconds.

C. 140 seconds.

D. 94.9 seconds.

The correct answer is option [C].

Solution: Rate of diffusion of hydrogen = $^{380cm3}/_{19\ s}$ = $20cm^3\ s^{-1}$. The vapour density of hydrogen = $^1/_2$ x 2
where vapour density of any gas = $^1/_2$ x Relative molecular mass of gas/vapour. V. $D._H$ = $^1/_2$ x 2 = 1. Graham's law mathematically expressed = $^{R_H}/_{RY}$ = $[^{\rho_Y}/_{\rho H}]$, where R_H = $20cm^3\ s^{-1}$, ρ_Y = 25, ρ_H = 1, R_Y = ?
$^{20}/_{RY}$ = $[^{25}/_1]$ → $^{20}/_{RY}$ = 5 → R_Y = $^{20}/_5$ = $4cm^3\ s^{-1}$. The time for Y to diffuse is rate = $^{volume}/_{time}$
time = $^{volume}/_{rate}$

2. The law which states that, 'If there is a mixture of gases which do not react chemically together, then the total pressure exerted by the mixture is the sum of the partial pressure of the individual gas that make up the mixture', is called _____

A. Boyle's law.

B. Dalton's law.

C. Graham's law.

D. Dalton's theory.

The correct answer is option [B].

Solution: Dalton's law of partial pressure states that if there is a mixture of gases which do not react chemically together then the total pressure exerted by the mixture is the sum of the partial pressure of the individual gas that make up the mixture.

3. A given amount of gas was collected over water at 302K where the vapour pressure of water was 4.0KN m-2. Calculate the pressure of the dry gas if the atmospheric pressure at the same temperature was 101.3KN m-2.

A. 105.3KN $m^{-2.}$

B. 97.3KN $m^{-2.}$

C. 101.3KN $m^{-2.}$

D. 93.7KN $m^{-2.}$

The correct answer is option [B].

Solution: Subtract the vapour pressure of water from the atmospheric pressure; 101.3 - 4.0 = 97.3KN m-2.

4. If 10cm3 of hydrogen gas were sparked with 20cm3 of oxygen, calculate the volume[s] of residual gas[es] after cooling.

A. 25cm^3 of $O_{2.}$

B. 5cm^3 of $O_{2.}$

C. 15cm^3 of $O_{2.}$

D. 10cm^3 of $O_{2.}$

The correct answer is option [C].

Solution: Write the balanced equation of the reaction → $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$; 2 moles of H_2 reacts with 1 mole of O_2, then 2cm^3 of H_2 reacts with 1cm^3 of O_2 → 10cm^3 of H_2 reacts with ?cm^3 of O_2 → $^{10}/_2$ = 5cm^3. Therefore, the residual gas is the unused oxygen since the volume of oxygen given is 20cm^3. The residual gas is 20 - 5 = 15cm^3.

5. The closer the molecules of a gas are in the liquid state _____

A. the more accurately it will follow the ideal gas equation.

B. the more it will deviate from the ideal gas equation.

C. the more random is the movement of its molecules.

D. the greater is the pressure it exerts on the walls of the container.

The correct answer is option [B].

6. Find the volume of 25.5g of ammonia, at s.t.p.

[Molar volume of a gas is 22.4dm^3, molar mass of NH_3 is 17g].

A. 3.36$dm^{3.}$

B. 33.6$dm^{3.}$

C. 14.9$dm^{3.}$

D. 1.49$dm^{3.}$

The correct answer is option [B].

Solution: Find the number of moles of ammonia containing 25.5g. Number of moles = mass of NH3/molar mass of NH3 = 25.5/17 = 1.5 moles. 1 mole of ammonia is equal to 22.4dm3 of NH3, therefore, 1.5 moles of NH3 = 1.5 x 22.4 = 33.6dm3.

7. Gay-Lussac's law states that _____

A. at constant pressure the volume of gaseous reactants are in a simple ratio to one another and to the volume of the product if gaseous.

B. at constant temperature the volume of gaseous reactants are in a simple ratio to one another and to the volume of the product if gaseous.

C. at constant pressure and volume the volume of gaseous reactants are in a simple ratio to one another and to the volume of the product if gaseous.

D. at constant pressure and temperature the volume of gaseous reactants are in a simple ratio to one another and to the volume of the product if gaseous.

The correct answer is option [D].

8. From the ideal gas equation, PV = nRT, the unit of n is _____

A. atm $dm^{3.}$

B. atm dm^3 K-1.

C. moles.

D. K^{-1} $mole^{-1.}$

The correct answer is option [C].

9. A certain mass of hydrogen gas collected over water at 8oC and 785 mmHg pressure has a volume of 65 cm3, the volume when it is dry at s. t. p. is _____

[SVP of water at 8oC = 14mmHg]

A. 64.1cm^3.

B. 62.2cm^3.

C. 67.9cm^3.

D. 66.$^{0}cm^3$.

The correct answer is option [A].

Solution: Subtracting the pressure at 8°C from the given pressure. Then using the equation $^{P_1V_1}/_{T1} = {}^{P_2V_2}/_{T2}$, where P_1 = 785 - 14 = 771mm Hg, V_1 = 65cm^3, T_1 = 8 + 273 = 281K, P_2 = 760mmHg, T_2 = 273K, V_2 = ? Substitute the values into the equation and solve.

10. How many molecules of oxygen gas are contained in 0.2 mole of oxygen gas?

[O = 16]

A. 0.20 x 10^{23}molecules.

B. 1.204 x 10^{23}molecules.

C. 2.40 x 10^{23}molecules.

D. 1 molecule.

The correct answer is option [B].

Solution: The number of molecules = number of moles of substance x 6.02 x 1023molecules = 0.2 x 6.02 x 1023 =

11. The mole fraction of oxygen in a gaseous mixture containing 2.5 moles of nitrogen, 1.5 moles of helium and 1 mole of oxygen is _____

A. 1/5.

B. 2/5.

C. 1/2.

D. 3/5.

The correct answer is option [A].

12. Kelvin temperature can be converted into celsius temperature by _____

A. °C = K - 273.

B. °C = K + 273.

C. °C + 273/K.

D. K + 273/oC

The correct answer is option [A].

Solution: K = °C + 273, therefore, °C = K - 273.

13. When pollen grains are suspended in water and viewed under a microscope, they appear to be in a state of constant but erratic motion. This is due to _____

A. a chemical reaction between the pollen grains and water.

B. convection current.

C. small changes in pressure.

D. the bombardment of the pollen grains by molecules of water.

The correct answer is option [D].

14. Given that r is rate and p is density, the expression $r \alpha 1/\sqrt{p}$ represents _____

A. Boyle's Law.

B. Charles' Law.

C. Dalton's Law.

D. Graham's Law.

The correct answer is option [D].

15. The relationship between volume of a given mass of gas and pressure at constant temperature is called _____

A. Charles' law.

B. Gay-Lussac's law.

C. Dalton's law.

D. Boyle's law.

The correct answer is option [D].

Solution: Boyle's law states that the volume of a given mass of gas is inversely proportional to its pressure provided that the temperature remains constant.

16. Which of these does not support the phenomenon of kinetic theory?

A. Brownian motion.

B. Diffusion.

C. Osmosis.

D. Linear expansion.

The correct answer is option [D].

Linear expansion explains expansion in solid, liquid and gas while the average kinetic theory explains the motion of gases only.

17. Hydrogen sulphide is prepared at one end of a laboratory. It takes 5 seconds for a student at the other end to smell it. How long will it take to smell sulphur dioxide from the same position?

A. 5 seconds.

B. 2.5 seconds.

C. 3.6 seconds.

D. 6.9seconds.

The correct answer is option [D].

Solution: $^{t_2}/_{t1} = [^{M_2}/_{M1}]$, where $t_1 = 5$ seconds, $M_1 = H_2S = 34$ g/mol, $M_2 = SO_2 = 64$ g/mol, $t_2 = ?$; $^{t_2}/_{5} = [^{64}/_{34}]$; $t_2 = {}^{8 \times 5}/_{34} = 6.86$ seconds ≈ 6.9 seconds.

18. The combination of butane in oxygen [air] is represented in the equation below;

C4H10(g) + O2(g) → H2O(g) + CO2(g).

Calculate the volume of oxygen at s. t. p. needed to burn 30cm3 of the butane.

A. 4.62cm^3.

B. 195cm^3.

C. 291.2dm^3.

D. 0.383$dm^{3.}$

The correct answer is option [B].

Solution: Write the balanced equation of reaction → $2C_4H_{10(g)}$ $13O_{2(g)}$ → $10H_2O_{(g)}$ + $8CO_{2(g)}$; From the equation 2 moles = 2cm^3 of $C_4H_{10(g)}$ reacts with 13 moles = 13cm^3 of $O_{2(g)}$; 30cm^3 of $C_4H_{10(g)}$ reacts with ____ of $O_{2(g)}$ = $^{30 \times 13}/_{2}$ = 195cm^3.

19. Water exists as a solid, liquid and gas respectively because _____

A. water is colourless.

B. water is electrovalent.

C. water in any state possesses a certain degree of motion in the molecules.

D. water is molecular.

The correct answer is option [C].

20. What is the volume of oxygen required to completely burn 40cm3 of ammonia gas if the reaction took place at a constant temperature and atmospheric pressure?

[Hint: Equation of reaction NH3(g) + O2(g) → NO(g) + H2O(g)]

A. 32cm3.

B. 50cm3.

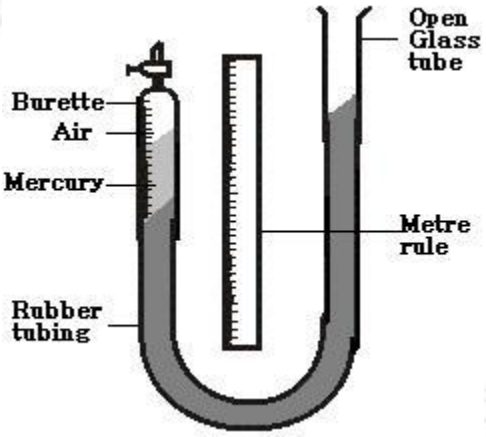
C. 5cm3.

D. 23cm3.

The correct answer is option [B].

Solution: First write the balanced equation of reaction. $4NH_3[g] + 5O_2[g] \rightarrow 4NO[g] + 6H_2O[g]$
4 moles of NH_3 reacts with 5 moles of O_2
4cm^3 of NH_3 reacts with 5cm^3 of O_2
40cm^3 of NH_3 reacts with __ of O_2 = $^{40 \times 5}/_{4}$ = 50cm^3.

21. The diagram drawn is a simple apparatus used to illustrate _____



A. Charles' law.

B. Dalton's law.

C. Boyle's law.

D. Gay-Lussac’s law.

The correct answer is option [C].

22. _____ is when more than the average kinetic energy of molecules escape.

A. Melting.

B. Freezing.

C. Evaporation.

D. Efflorescence.

The correct answer is option [C].

23. br360cm3 of a gas has a pressure of 760mmHg. Find its volume if the pressure is reduced to 742mmHg.

A. 351.5cm3.

B. 1566.4cm3.

C. 368.7cm3.

D. 156.2cm3.

The correct answer is option [C].

Solution: Using the equation $P_1V_1 = P_2V_2$
where P_1 = 760mmHg, V_1 = 360cm^3, P_2 = 742mmHg, V_2 = ?
Then $V_2 = {}^{P_1 \times V_1}/_{P2}$
Substitute the values into the equation to solve for V_2.

24. The vapour pressure of a liquid depends on _____

[i] the temperature

[ii] the nature of the liquid

[iii] the type of liquid

A. [i] and [iii] only.

B. [i] only.

C. [i] and [ii] only.

D. [i], [ii] and [iii]

The correct answer is option [C].

25. Find the volume of hydrogen produced at s. t. p. when 25g of zinc are added to excess dilute hydrochloric acid at 31oC and 778mmHg pressure.

[H = 1, Zn = 65, Cl = 35.5, molar volume of a gas at s. t. p. = 22.4dm3]

A. 17.248dm3.

B. 7.93dm3.

C. 15.86dm3.

D. 18.76dm3.

The correct answer is option [B]. (s) + $2HCl_{(aq)} \rightarrow ZnCl_{(aq)} + H_{2(g)}$; The number of moles of Zn = ${}^{\text{mass of Zn}}/_{\text{molar mass of Zn}} = {}^{25}/_{65}$ = 0.385 moles; From the equation of reaction, 1 mole of Zn yields 1mole of HCl, then 0.385 moles of Zn will yield 0.385 moles HCl; Volume of hydrochloric acid = 0.385 x 22.4dm^3 = 8.624dm^3; The volume of hydrogen at s. T. P using the equation $\rightarrow {}^{P_1V_1}/_{T1} = {}^{P_2V_2}/_{T2}$, where P_1 = 778mmHg, V_1 = 8.624dm^3, T_1 = 31^{o}C = 273 + 31 = 304K, P_2 = 760mmHg, T_2 = 273K, V_2 = ? $V_2 = {}^{P_1V_1T_2}/_{P2T1}$; Substitute the values into the equation and solve.

26. When the number of particles condensing into liquid is equal to the number of particles evaporating from the liquid it is called _____

A. evaporation.

B. boiling.

C. saturated vapour pressure.

D. condensation.

The correct answer is option [C].

27. The vapour density of a gas is defined as _____

A. the number of times a given volume of the gas (or vapour) is as heavy as the same volume of hydrogen at a particular temperature and pressure.

B. the number of times a given volume of the gas (or vapour) is as heavy as the same volume of hydrogen at a particular temperature.

C. the number of times a given volume of the gas (or vapour) is as heavy as the same volume of carbon at a particular temperature and pressure.

D. the number of times a given volume of the gas (or vapour) is as heavy as the same volume of hydrogen at a particular pressure.

The correct answer is option [A].

28. The molar volume of any gas is equal to _____

A. $2.24dm^3$.

B. $224Ocm^{3.}$

C. $224dm^3$.

D. $22.4dm^{3.}$

The correct answer is option [D].

29. The pressure on 100cm3 of oxygen gas at 35oC is 750mmHg. What would be the volume of the gas in dm3 if the pressure is increased to 1000mmHg without changing the temperature?

A. 55.3dm3.

B. 65.5dm3.

C. 75.0dm3.

D. 87.5dm3.

The correct answer is option [C]

30. At 20oC, a sample of hydrogen gas occupies 360cm3. What will the volume be at 80oC, if the pressure remains constant?

A. 287.3cm3.

B. 298.8cm3.

C. 433.7cm3.

D. 343.8cm3.

The correct answer is option [C].

Solution: Using the equation V1/T1 = V2/T2, where V1 = 360cm3, T1 = 20oC = 273 + 20 = 293K, T2 = 80oC = 273 + 80 = 353, and V2 = ? Substitute the values into the equation and solve.

31. 400cm3 of a gas n diffused through a porous pot in 2 minutes. Calculate the rate at which n diffuses.

A. 6.3cm3 s-1.

B. 20cm3 s-1.

C. 200cm3 s-1.

D. 3.33cm3 s-1.

The correct answer is option [D].

Solution: Rate of diffusion of n = Volume/Time, where Volume = 400cm3 and Time = 2 minutes which is equivalent to 2 x 60 = 120 seconds. Therefore, Rn = 400/120 = 3.33cm3 s-1.

32. According to the kinetic molecular theory, molecules are in random motion. This motion is greatest when a substance is changing from _____

A. gas to liquid.

B. liquid to gas.

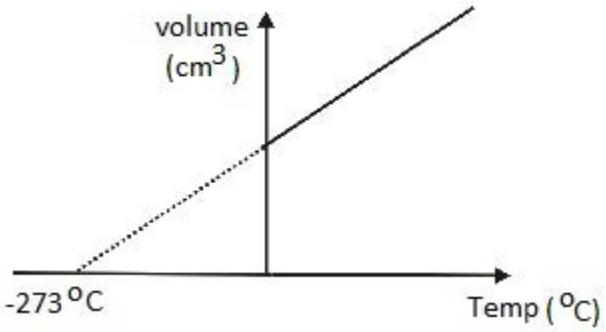
C. liquid to solid.

D. solid to gas.

The correct answer is option [B].

Use the graph to answer the question.

33. The graph illustrates _____ law.



A. Boyle's

B. Charles'

C. Dalton's

D. Gay-Lussac's

The correct answer is option [B].

34. Under the same conditions of temperature and pressure, oxygen diffuses twice as fast as a gas, Y, the relative molecular mass of Y is _____

[Relative molar mass of oxygen = 32]

A. 128.

B. 64.

C. 32.

D. 256.

The correct answer is option [A].

Solutiuon $^{R_O}/_{RY}$ = $[^{M_Y}/_{MO}]$, where R_O = Rate of diffusion of oxygen = 2, R_Y = Rate of diffusion of gas = 1, M_O = Relative Molecular Mass = 32, M_Y = Relative Molecular Mass of gas = ? → $^2/_1$ = $[^{M_Y}/_{32}]$; square both sides of the equation $[^2/_1]^2$ = $^{M_Y}/_{32}$; M_Y = 4 x 32 = 128.

35. If 465cm3 of sulphur[iv]oxide can diffuse through a porous partition in 30 seconds, how long will it take oxygen to diffuse through the same partition?

[S = 32, O = 16]

A. 21.2 seconds.

B. 60 seconds.

C. 30 seconds.

D. 15 seconds.

The correct answer is option [A].Solution: Relative molecular mass of SO_2 = 32 + [16 × 3] = 32 + 32 = 64g/mol; relative molecular mass of O_2 = 16 x 2 = 32g/mol. Using the equation $[^{M_{O2}}/_{MSO2}]$ = $^{t_{O2}}/_{tSO2}$, where M_{SO2} = 64g/mol, M_{O2} = 32g/mol, t_{SO2} = 30 seconds, t_{O2} =, ? $[^{32}/_{64}]$ = $^{t_{O2}}/_{30}$; $[^1/_2]$ = $^{t_{O2}}/_{30}$; t_{O2} = $[^1/_2]$ x 30 = 0.5 x 30 = 21.2 seconds.

36 The general gas equation is mathematically expressed as _____

A. PV/nT.

B. PVT.

C. PV/T.

D. PT/V.

The correct answer is option [C].

Solution: By the gas law, Boyle's law and Charles' law combining these laws PV = k and V/T = k. Then the general gas equation is PV/T = k.

37. When pollen grains are suspended in water and viewed through a microscope, they appear to be in a state of constant but erratic motion. This is due to _____

A. convection currents.

B. small changes in pressure.

C. small changes in temperature.

D. the bombardment of the pollen grains by molecules of water.

The correct answer is option [D].

38. The value of a standard pressure and temperature of a gas is _____ and _____

A. 760cmHg and 273oC.

B. 760mmHg and 273K.

C. 0.76cmHg and 273oC.

D. 760cmHg and 273K.

The correct answer is option [B].

Solution: The standard pressure and temperature is 760mmHg and 273K.

39. The presence of sodium chloride in ice will _____

A. decrease or lower the boiling point of sodium chloride.

B. increase the melting point of sodium chloride.

C. make sodium chloride impure.

D. lower the freezing point of sodium chloride.

The correct answer is option [A].

Reason: Sodium chloride has a high heat content which is reduced when placed in ice.

40. Find the volume of oxygen at s.t.p. required to produce 2.5cm3 of steam.

A. 8.96cm3.

B. 5cm3.

C. 1.25cm3.

D. 2cm3.

The correct answer is option [C].

Solution: First write the balanced equation of reaction $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$
1 mole of $H_2O(g)$ is equal to $22.4dm^3$,
2 moles of $H_2O(g)$ is $2 \times 22.4 = 44.8dm^3$.
1 mole of oxygen produces 2 moles of steam, then 1 mole of oxygen is equal to $22.4dm^3$.
Therefore, the volume of oxygen required to produce $2.5cm^3$ of steam gives $44.8dm^3$;
∴ ____ gives $22.4dm^3$
$= {}^{2.5 \times 22.4}/_{44.8} = 1.25cm^3$.

41. To what temperature in kelvin must a gas be raised from 273K in order to double both its volume and pressure?

A. 298.

B. 300.

C. 546.

D. 819.

The correct answer is option [C].

42. Ice is less dense than water because it _____

A. cannot take the shape of the container.

B. has a lower temperature.

C. has an open crystalline lattice.

D. has rigid molecules that oscillate about a fixed.

The correct answer is option [C].

43. Equal volumes of all gases at the same temperature and pressure contain the same number of molecules is known as _____

A. Avogadro's law.

B. Archimedes theory

C. Avogadro's hypothesis.

D. None of the above.

The correct answer is option [C].

44. The relationship between volume of a given mass of gas and temperature at constant pressure is _____

A. Boyle's law.

B. Gay-Lussac’s law.

C. Charles' law.

D. Dalton's law.

The correct answer is option [C].

Solution: Charles' law states that the volume of a given mass of gas is directly proportional to its temperature provided pressure is constant.

45. What will be the new volume [V] if the new pressure is halved and the initial pressure remain the same _____

A. $2P_1V_1 = P_2V_2$.

B. $P_1V_1 = 2P_2V_2$.

C. $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$.

D. $P_1V_1 = \frac{P_2V_2}{T_2}$.

The correct answer is option [A].

Solution: As the pressure is halved volume is doubled since Boyle's law best explains the phenomenon that takes place between the relationship of pressure and volume of a given mass of gas. As pressure increases volume decreases or vice versa.

46. If the rate of diffusion of oxygen gas is 1, what will be the rate of diffusion of methane whose relative molar mass is 16?

A. 0.5.

B. 1.2.

C. 1.4.

D. 1.8.

The correct answer is option [C].

47. The force that the gaseous particles exert per unit area of the wall is known as _____

A. atmospheric pressure.

B. liquid pressure.

C. gas pressure.

D. all of the above.

The correct answer is option [C].

48. What volume of steam would be produced if two volumes of oxygen were exploded with four volumes of hydrogen?

A. 2.

B. 3.

C. 4.

D. 5.

The correct answer is option [C].

49. _____ increases as the vapour pressure increases.

A. Condensation

B. Evaporation

C. Melting

D. Boiling

The correct answer is option [A].

50. The pressure exerted by a gas is as a result of _____

A. the continuous random motion of its particles.

B. bombardment of the walls of the container by its molecules.

C. the expansion of the gas molecules.

D. the elastic nature of the gas molecules.

The correct answer is option [B].

51. The movement of water molecules through a semi-permeable membrane from a region of high concentration to a region of low concentration is called _____

A. diffusion.

B. Brownian movement.

C. transportation.

D. osmosis.

The correct answer is option [D].

52. The law which states that at a constant temperature and pressure, the rate of diffusion of a gas is inversely proportional to the square root of its relative molecular mass is called _____

A. Gay-Lussac's law.

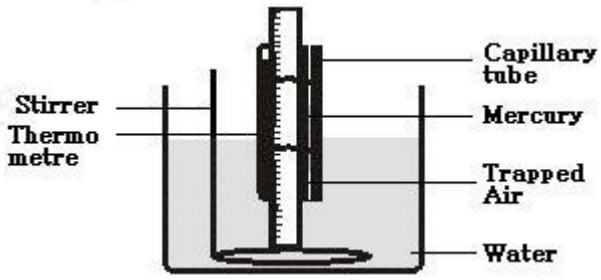
B. Boyle's law.

C. Avogadro's hypothesis.

D. Graham's law.

The correct answer is option [D].

53. The diagram drawn is a simple apparatus used to illustrate _____



A. Boyle's law.

B. Gay-lussac's law.

C. Dalton's law.

D. Charles' law.

The correct answer is option [D].

54. By experiment, 2 volumes of ammonia decompose to give 1 volume of nitrogen and 3 volumes of hydrogen. Applying a chemical law this becomes: 2 molecules of ammonia decompose into 1 molecule of nitrogen and 3 molecules of hydrogen. The law applied is _____

A. Boyle's law.

B. Charles' law.

C. Gay-Lussac's law.

D. Avogadro's law.

The correct answer is option [D].

55. Convert -132oC to kelvin temperature.

A. -405K.

B. 141K.

C. 405K.

D. -141K.

The correct answer is option [B].

Solution: Kelvin temperature = oC + 273. Therefore, K = -132oC + 273 = 141K.

56. The volume of any gas occupied by one mole of that gas at s.t.p. is called _____

A. gas volume.

B. mole volume.

C. ideal gas volume.

D. molar volume.

The correct answer is option [D].

57. The ideal gas equation is mathematically expressed as _____

A. PV/T.

B. PV/nT.

C. PVT.

D. PT/nV.

The correct answer is option [B].

Solution: The ideal gas equation states that the pressure and volume of a given mass of gas is directly proportional to the temperature and number of moles of the gas . It is mathematically expressed as PV α nT, therefore, PV = nRT, where R is the gas constant.

58. Boyle's law is explained as follows.

A. If the volume of a given mass of gas is reduced at constant temperature, the molecules move faster and so cause greater pressure.

B. If the volume of a given mass of a gas is reduced at constant temperature, the molecules strike the walls of their container more often and so cause greater pressure.

C. If pressure of a fixed mass of gas is increased, the molecules move more slowly and so cause greater pressure.

D. If the pressure of a fixed mass of gas is increased, the temperature rises and so the molecules strike the walls of their container more often.

The correct answer is option [B].

59. A given volume of oxygen diffused through a porous partition in 8 seconds. How long would it take the same volume of carbon (IV) oxide to diffuse under the same condition?

[C = 12.0, O = 16.0]

A. 5.8 seconds.

B. 6.8 seconds.

C. 9.4 seconds.

D. 11.0 seconds.

The correct answer is option [A].Using the equation:

$t1/t2 = \sqrt{[M2/M1]}$

60. Which of the three states of matter has no fixed shape, no fixed volume and least dense?

A. Gas.

B. Liquid.

C. Solid.

D. Crystals.

The correct answer is option [A].

61. At s. t. p. a certain mass of gas occupies a volume of 780cm3. Find the temperature at which the gas occupies 1008cm3 and has a pressure of 710mmHg.

A. 377.6K.

B. 329.6K.

C. 226.1K.

D. 197.4K.

The correct answer is option [B].

Solution: Using the equation, $_1V_1/_{T1} = {}^{P}{}_2V_2/_{T2}$, where P_1 = 760mmHg, V_1 = 780cm^3, T = 273K, P_2 = 710mmHg, V_2 = 1008cm^3, T = ? Substitute the values into the equation and solve.

62. 30cm3 of sulphur [IV] oxide are sparked with 25cm3 of oxygen. If all the volume of gases are measured at s. t. p., the volume of the residual gases after sparking is _____

[Hint: Equation of the reaction SO3(g) + O2(g) → SO4(g)]

A. 30cm3.

B. 45cm3.

C. 40cm3.

D. 55cm3.

The correct answer is option [C].

Solution: First write the balanced equation of reaction $2SO_3(g) + O_2(g) \rightarrow 2SO_4(g)$ from the balanced equation 2cm^3 of SO_3 reacts with 1cm^3 O_2, the given volume find the volume of oxygen that reacted 30cm^3 of SO_3 reacts with __ of O_2 which is equal to $^{30 \times 1}/_2$ = 15cm^3 of oxygen reacted. From the given volume 25cm^3 of O_2 reacted then the residual gas is 25 - 15 = 10cm^3
Therefore, the residual gases after sparking is 10 + 30 = 40cm^3.

63. _____ occurs when the saturated vapour pressure of a liquid equals the atmospheric pressure.

A. Evaporation

B. Melting

C. Boiling

D. Condensation

The correct answer is option [C].

64. 298 cm3 of a gas collected over water at 2oC and 780mm of Hg, what will be the volume at S.T.P. when the water vapour pressure is 20 mm of Hg?

A. 273 cm3.

B. 293 cm3.

C. 296 cm3.

D. 278 cm3.

The correct answer is option [C].

Solution: $^{P_1V_1}/_{T1} = {}^{P_2V_2}/_{T2}$, where P_1 = 780 - 20 = 760 mmHg since V. P. of water = 20 mmHg, V_1 = 298 cm^3, T_1 = 2°C = 273 + 2 = 275 K, P_2 = at stp = 760 mmHg, T_2 = 273 K, V_2 = ?; $V_2 = {}^{P_1V_1T_2}/_{T1P2} = {}^{760 \times 298 \times 273}/_{275 \times 760}$ = 295.8 cm^3 ≈ 296 cm^3.

65. Which of the following theory does not describe the behaviour of an ideal or perfect gas?

[i] The gas molecules move randomly in straight lines

[ii] The collision of the gas molecules are perfectly inelastic

[iii] The cohesive forces between the gas molecules are negligible

[iv] The temperature of the gas is a measure of the average kinetic energy of the gas particles.

A. [i] only.

B. [ii] only.

C. [i] and [iii] only.

D. [iv] only.

The correct answer is option [B].

Reason: The collision of the gas molecules are perfectly elastic.

66. Find the volume of 2.5 moles of oxygen.

A. 5.6dm3.

B. 560dm3.

C. 56dm3.

D. 0.56dm3.

The correct answer is option [C].

Solution: The molar volume for any gas is 22.4dm3. Therefore, the volume of oxygen = 2.5 x 22.4dm3 = 56dm3.

67. _____ increases with increase in temperature.

A. Boiling

B. Vapour pressure

C. Rate of evaporation

D. Latent heat of vaporization

The correct answer is option [C].

68. How many atoms are contained in 2g of hydrogen gas?

[H = 1]

A. 6.02 x 1023atoms.

B. 6.02 x 1023molecules.

C. 12.04 x 1023atoms.

D. 12.04 x 1023molecules.

The correct answer is option [A].

Solution: Calculate the numbers of moles of hydrogen gas, H = 1 x 2 = 2g/mol; number of moles = mass of H2/molar mass of H2 = 2/2 = 1 mole. Therefore, the number of atoms of H2 = number of moles of H2 x 6.02 x 1023 = 1 x 6.02 x 1023atoms.

69. 272cm3 of carbon[iv]oxide were collected over water at 15oC and 782mmHg pressure. Calculate the volume of the dry gas at s. t. p.

[SVP of water at 15oC is 12mmHg]

A. 261.2cm3.

B. 254.5cm3.

C. 290.7cm3.

D. 283.2cm3.

The correct answer is option [A].

Solution: true pressure of CO_2 = 782 - 12 = 770mmHg. Using the equation $^{P_1V_1}/_{T1} = {}^{P_2V_2}/_{T2}$, where P_1 = 770mmHg, V_1 = 272cm^3, T_1 = 15°C = 273 + 15 = 288K, P_2 = 760mmHg, T_2 = 273K, V_2 = ? $V_2 = {}^{P_1V_1T_2}/_{P2T1} = {}^{770 \times 272 \times 273}/_{288 \times 760}$ = 261.2cm^3.

70. If 465cm3 of sulphur[iv]oxide can diffuse through a porous partition in 30 seconds, how long will 620cm3 of hydrogen sulphide take to diffuse through the same partition?

[H = 1, S = 32, O = 16]

A. 54.9 seconds.

B. 16.4 seconds.

C. 30.9 seconds.

D. 29.1 seconds.

The correct answer is option [D].

Solution: Rate of diffusion of SO_2 = $^{volume}/_{time}$, where v = 465cm^3 and time = 30 secs; rate of diffusion of SO_2 = $^{465}/_{30}$ = 15.5cm^3/s; relative molecular mass of SO_2 = 32 + [16 x 3] = 32 + 32 = 64g/mol; relative molecular mass of H_2S = [1 x 2] + 32 = 2 + 32 = 34g/mol; Using the equation $^{R_{SO2}}/_{RH2S} = [{}^{M_{H2S}}/_{MSO2}]$, where R_{SO2} = 15.5cm^3/s, M_{SO2} = 64g/mol, M_{H2S} = 34g/mol, R_{H2S} = ? → $^{15.5}/_{RH2S} = [{}^{34}/_{64}]$; $R_{H2S} = {}^{15.5}/_{[0.53125]} = {}^{15.5}/_{0.729}$ = 21.3cm^3/s; Time for H_2S to diffuse = $^{Volume}/_{RH2S} = {}^{620}/_{21.3}$ = 29.11 seconds ≈ 29.1 seconds.

71. The diagram drawn represents one of the gas laws, which mathematical equation best explains the diagram?

A. P α V.

B. P α 1/V2.

C. P α V2.

D. P α 1/V.

The correct answer is option [D].

Solution: Boyle's law gives a straight line graph.

72. P1V1 = P2V2 supports _____

A. Charles' law.

B. Boyle's law.

C. Graham's law.

D. Avogadro's law.

The correct answer is option [B].

73. Convert 405K to celsius temperature.

A. -132°C.

B. 678°C.

C. 132°C.

D. -678°C.

The correct answer is option [C].

°C = K - 273 = 405 - 273 = 132°C.

74. An increase in temperature causes an increase in the pressure of a gas because _____

A. it increases the mass of the molecules.

B. it causes the molecules to combine together.

C. it decreases the average velocity of the molecules.

D. it increases the average velocity of the molecules.

The correct answer is option [D].

TOPIC: PERIODIC TABLES. FAMILIES OF ELEMENTS

DIRECTION: Choose the correct answer from the lettered options.

1. Which of the following statements about the electronic configurations of two elements X and Z given below, is correct?

(i) X $1s^2 2s^2 2p5$

(ii) Z $1s^2 2s^2 2p^6 3s^2 3p^5$

A. X and Z both form anions readily.

B. X forms anions and Z forms cations only.

C. X forms cations and Z forms anions only.

D. X and Z both form cations readily.

The correct answer is option [A]

2. Mendeleev periodic table was arranged in order of their _____

A. atomic numbers.

B. molecular shapes and orbitals.

C. increasing relative atomic mass.

D. orbital configuration.

The correct answer is option [C].

3. The atomic numbers of the following elements T, X, Y, W and Z are 10, 11, 12, 14 and 15. Which element is an alkali and alkali-earth metal?

A. X and T.

B. W and Z.

C. X and Y.

D. T and Z.

The correct answer is option [C].

Reason: Elements X and Y having an atomic number of 11 and 12 written in their electronic configuration gives $1s^2 2s^2 2p^6 3s^1$ and $1s^2 2s^2 2p^6 3s^2$ alkali metals are

elements with one electron in its outermost shell and alkali-earth metals are elements with two electrons in its outermost shell.

4. Which of the following represents an inert gas configuration?

A. $1s^{2.}$

B. $1s^2 2s^2$.

C. $1s^2 2s^2 2p^1$.

D. $1s^2 2s^2 2p^2$.

The correct answer is option [A].

5.The electronic configuration of an element is $1s^2\ 2s^2\ 2p^6\ 3s2\ 3p^3$. How many unpaired electrons are there in the element?

A. 5.

B. 4.

C. 3.

D. 2.

The correct answer is option [C].

6. From the diagram drawn, the element that is a halogen is _____

1 A							
		5 E					10 J
11 K	12 L					17 Q	

A. J.

B. Q.

C. K.

D. A.

The correct answer is option [B].

7. The following are periodic properties except _____

A. ionization potential.

B. electronegativity.

C. electron affinity

D. ionic affinity.

The correct answer is option [A].

8. The following options are properties of elements which show periodicity except _____

A. ionization energies and electron affinity.

B. electropositivity.

C. melting and boiling point.

D. electrical and thermal conductivities.

The correct answer is option [B].

Reason: Electronegativity is the property of element that show periodicity not Electropositivity.

9. Which one of the following statements is true of elements in the modern periodic table?

A. Elements with similar properties occur in horizontal rows.

B. The elements in group VIII of the table form monatomic ions with a charge of -1.

C. The elements are arranged in order of increasing atomic number.

D. The elements are arranged in order of increasing mass number

The correct answer is option [C].

10. Which of these metals is a liquid at room temperature?

A. Beryllium

B. Lithium

C. Mercury

D. Osmium

The correct answer is option [C].

11. An atom is said to be neutral when _____

A. the number of protons and neutrons are equal.

B. the number of electrons and neutrons are different.

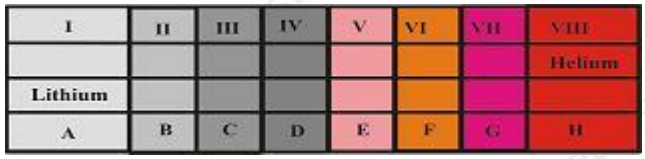
C. the number of protons and electrons are greater than the number of neutrons.

D. the number of protons and electrons are equal.

The correct answer is option [D].

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

12. G is in a group known as _____



A. alkali metals.

B. alkaline-earth metals.

C. rare gases.

D. Halogens.

The correct answer is option [D].

13. The chemically unreactive group of elements is called the _____

A. alkali metals.

B. alkaline earth metals.

C. halogens.

D. noble gases.

The correct answer is option [D].

14. Which element is an example of a noble gas?

A. Krypton.

B. Chlorine.

C. Iridium.

D. Nitrogen.

The correct answer is option [A].

15. The atomic radius decreases with _____ in ionization energy.

A. a decrease

B. no change

C. an increase

D. a change

The correct answer is option [C].

16. Bronze is an alloy of _____

A. silver and copper.

B. silver and gold.

C. copper and tin.

D. copper and zinc.

The correct answer is option [C].

17. Which of the following decreases across the period?

A. Atomic size.

B. Electron Affinity.

C. Electronegativity.

D. Inert tendencies.

The correct answer is option [A].

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

18. The element that can exit as atoms is _____

A. D.

B. E.

C. F.

D. H.

The correct answer is option [D].

19. A gradual change of property within a group is known as _____

A. period trend.

B. triad.

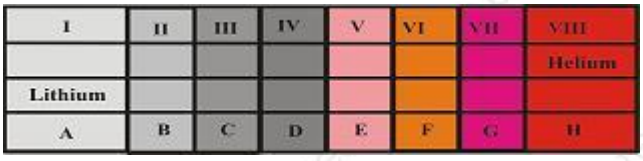
C. group trend.

D. family.

The correct answer is option [C].

Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

20. The compound formed between C and G will be _____



A. ionic and solid.

B. ionic but gaseous.

C. covalent but soild.

D. covalent but gaseous.

The correct answer is option [A].

21. The electronic configuration, $1s^2 2s^2 2p^6 3s^2 3p^6$ is that of a _____

A. noble gas.

B. group ii element.

C. group iii element.

D. group v element.

The correct answer is option [A].

22. Lithium, berylium, and boron have oxidation numbers 1, 2, and 3 respectively. Therefore the oxidation number of the hydrogen atom when it forms hydrides of these elements is _____

A. +1.

B. -1.

C. +2.

D. -2.

The correct answer is option [B].

23. The ionization energy of an atom is affected by the following except _____

A. the size of the negative nuclear charge.

B. the distance of the outermost electron from the nucleus.

C. the screening effect of the inner electron.

D. the size of the positive nuclear charge.

The correct answer is option [A].

24. In the periodic table, elements are arranged according to their _____

A. atomic masses.

B. mass numbers.

C. atomic numbers.

D. valence electrons.

The correct answer is option [C].

25. All the electrons in a given shell possess approximately _____

A. equal energy.

B. different energy.

C. less energy to each other.

D. greater energy in the first shell.

The correct answer is option [A].

26. _____ is the variation of the properties of elements in a regular pattern both down the groups and across the periods.

A. Periodic Table

B. Periodic law

C. Periodicity

D. Periodic function

The correct answer is option [C].

27. Which element has the highest first ionization energy?

A. Sodium

B. Aluminium

C. Calcium

D. Phosphorus

The correct answer is option [D].

Phosphorus (P) has a first ionization energy of 1012kJ/mol

28. The following affects the ionization energy of an atom except _____

A. distance of the outermost electron from the nucleus.

B. the size of the positive nuclear charge.

C. the screening effect of the inner electrons.

D. solvent medium.

The correct answer is option [D].

29. A species has 20 neutrons, 17 protons and 18 electrons. Which of the following statements is correct?

A. It is a calcium ion, Ca^{2+} .

B. It is a chloride ion, Cl^-.

C. It is a neutral atom of argon, Ar.

D. It is a sulphide ion, S^{2-}.

The correct answer is option [B].

30. Important properties of elements which show periodicity are _____

A. melting and boiling points.

B. electrical conductivities.

C. ionization energies and atomic size.

D. size of the positive nuclear charge.

The correct answer is option [A].

Reason: Important properties of elements which show periodicity are

[i] Melting and Boiling points;

[ii] Electrical and Thermal conductivities;

[iii] Ionization Energies and Electron Affinities;

[iv] Electronegativities.

31. The elements in group 1 are called _____

A. alkali non-metals.

B. alkali-earth metals.

C. alkali metals.

D. acids.

The correct answer is option [C].

32. The electronic configuration of an element in its ground state is 1s22s22p63s23p2. Which of the following statements is correct?

A. An atom of the element has 2 valence electrons.

B. An atom of the element has 3 valence electrons.

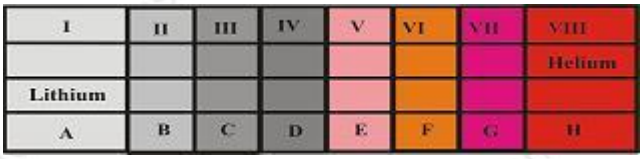
C. The element is from Group 3 of the periodic table.

D. The element is in period 3 of the periodic table.

The correct answer is option [D].

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

33. An element in the same group with the element that forms the largest number of compounds is ____



A. A.

B. C.

C. D.

D. F.

The correct answer is option [C].

The diagram drawn is a periodic table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

34. The strongest oxidizing agent is _____

A. H.

B. G.

C. F.

D. E.

The correct answer is option [B].

35. Which group of elements forms hydrides that are pyramidal in structure?

A. Group III.

B. Group IV.

C. Group V.

D. Group VI.

The correct answer is option [C].

36. When a metal atom combines with a non-metal atom, the non-metal atom will _____

A. lose electrons and decrease in size.

B. lose electrons and increase in size.

C. gain electrons and decrease in size.

D. gain electrons and increase in size.

The correct answer is option [D].

Metals tend to lose ellectrons (becoming smaller ions) while nonmetals tend to gain electrons and become larger ions.

37. The attractive force exerted by the nucleus on the outermost electrons of the atom _____

A. decreases across a period.

B. increases down a group.

C. increases across a period.

D. decreases down a group.

The correct answer is option [C].

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A – H represent elements whose symbols have not been used.

38. The oxide formed by C is _____

I	II	III	IV	V	VI	VII	VIII
							Helium
Lithium							
A	B	C	D	E	F	G	H

A. acidic.

B. amphoteric.

C. neutral.

D. basic.

The correct answer is option [B].

39. The sugar that is produced by plants during photosynthesis is _____

A. galactose.

B. fructose.

C. glucose.

D. sucrose.

The correct answer is option [C].

40. _____ discovered the method of arrangement of elements according to their atomic mass.

A. Mendeleev

B. Dalton

C. Chadwick

D. Niels Bohr

The correct answer is option [A].

41. Which of the following statements is true?

A. Chlorine commonly forms monoatomic ions with a +1 charge.

B. Helium can exist as a monoatomic gas.

C. Sodium exists as diatomic molecules

D. The elements are arranged in the modern periodic table in order of increasing mass number.

The correct answer is option [B].

42. The following groups of elements except _____ show great similarity in their chemical properties

A. Group 1.

B. Group 7.

C. Group 0.

D. Group 5.

The correct answer is option [D].

43. Which compound forms a coloured aqueous solution?

A. $CaCl_2$.

B. $CrCl_3$.

C. NaOH.

D. KBr.

The correct answer is option [B].

Colored aqueous solutions are a characteristic of transition compounds. The only transition compound in the above choices is option [B]. Cr is a transition element.

44. Which of the following statements about the trends down group seven (lowest to highest atomic number) in the periodic table is correct?

A. The atomic size increases.

B. The non-metallic character increases.

C. The ionisation energy increases.

D. The number of electrons in the valence shell increases.

The correct answer is option [A].

45. The atomic numbers of the following elements T, X, Y, W and Z are 10, 11, 12, 14 and 15. Which element has the same number of electron as a noble gas?

A. X.

B. Y.

C. W.

D. T.

The correct answer is option [D].

Reason: Element T has an atomic number of 10 when written in its electronic configuration gives 1s22s22p6 and the shell 2,8 this represent a noble gas configuration an octect filled shell.

46. Which three groups of the Periodic Table contain the most elements classified as metalloids (semi-metals)?

A. 1, 2, and 13.

B. 2, 13, and 14.

C. 14, 15, and 16.

D. 16, 17, and 18.

The correct answer is option [C].

47. S-block elements of the periodic table are made up of _____

A. Groups 1, 2 and 3.

B. Groups 1 and 2.

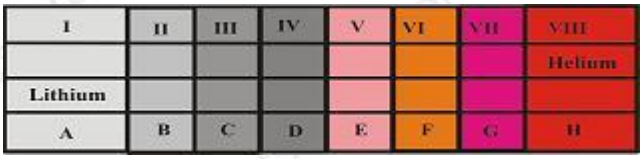
C. Group 3.

D. Group 3 to 7.

The correct answer is option [B].

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

48. Lithium, Beryllium, Boron, Carbon, Nitrogen, Oxygen, Fluorine, and Neon are in the same period of the periodic table, therefore _____



A. they react alike.

B. their oxides are basic.

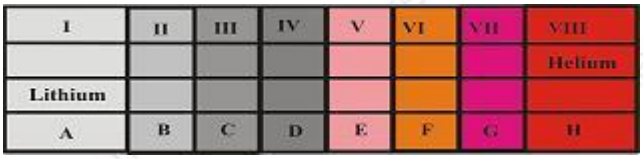
C. their chlorides are soluble in water.

D. they behave differently.

The correct answer is option [D].

Diagram drawn is a Periodic Table.In this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

49. The compound formed between C and F has the formula _____



A. CF.

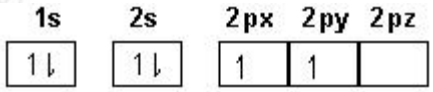
B. CF_2.

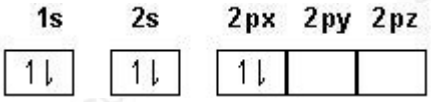
C. C_2F.

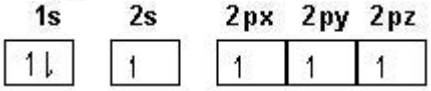
D. C_2F_3.

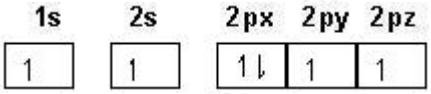
The correct answer is option [D].

50. Which of the following represents the ground state electronic configuration of an element with atomic number of 6?

A. 

B. 

C. 

D. 

The correct answer is option [A].

51. All of the following elements except _____are alkali metals.

A. sodium

B. rubidum

C. cesium

D. radium

The correct answer is option [D].

52. What is the electronic configuration of an element represented as 199X?

A. $1s^2\ 2s^2\ 2p^5$.

B. $1s^2\ 2s^2\ 3s^2\ 3p^3$

C. $1s^2\ 2s^2\ 2p^3\ 3s^2$.

D. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$

The correct answer is option [A].

53. Group 1A metals are not found free in nature because they _____

A. have low melting and boiling points.

B. have weak metallic bonding.

C. conduct electricity and heat.

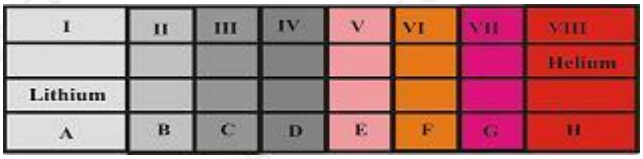
D. are very reactive.

The correct answer is option [D].

They are alkali metals e.g. Na, K, Li etc.

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

54. The strongest reducing agent is _____



A. C

B. B

C. A

D. G

The correct answer is option [C].

55. Which halogens are gases at STP?

A. chlorine and fluorine.

B. chlorine and bromine.

C. iodine and fluorine.

D. iodine and bromine.

The correct answer is option [A].

56. Atoms with the largest atomic radius are located _____

A. at the top of their group.

B. in the middle of their group.

C. at the bottom of their group.

D. you cannot predict atomic radius by location within a group.

The correct answer is option [C].

57. Which of the following atoms in its ground state has the greatest number of valence electrons?

A. Al.

B. P.

C. S.

D. Si.

The correct answer is option [C].

58. All these properties belong to the halogens except _____

A. they are all non-metals.

B. they exist as diatomic molecules.

C. they are coloured.

D. they do not ionize to form univalent negative ions.

The correct answer is option [D].

Reason: Halogens ionize to form univalent negative ions.

59. An ion of a metal is _____

A. smaller than the atom from which it is formed.

B. larger than the atom from which it is formed.

C. equal to the atom from which it is formed.

D. all of the above.

The correct answer is option [A].

60. Elements in the same group may be said to belong to _____

A. a family.

B. a group trend.

C. a triad.

D. a period trend.

The correct answer is option [A].

61. The energy required to remove a valence electron from an atom of the element to form an ion is called _____

A. thermal energy.

B. electron affinity.

C. ionization energy.

D. electronegativity.

The correct answer is option [C].

62. When the number of electrons increases, the electrons occupies the shell with _____

A. the lowest energy level.

B. the same energy level.

C. the highest energy level.

D. all of the above.

The correct answer is option [C].

63. Elements in the same group of the periodic table have _____

A. similar electronic configuration.

B. similar orbital configuration.

C. the same number of valence electrons.

D. the same number of electrons.

The correct answer is option [C].

64. Which element derives its symbol from the latin word, aurum, which means 'shining dawn'?

A. Aluminum.

B. Americium.

C. Gold.

D. Silver.

The correct answer is option [C].

65. The following are S-block elements except _____

A. lithium.

B. magnesium.

C. potassium.

D. boron.

The correct answer is option [D].

66. Which of the following elements has the lowest ionisation energy?

A. Chlorine.

B. Fluorine.

C. Magnesium.

D. Sodium.

The correct answer is option [D].

67. The periodic law states that _____

A. the physical properties of the elements are a Periodic Table of their atomic numbers.

B. the physical and chemical properties of the elements are a Periodic Function of their atomic numbers.

C. the physical and chemical properties of the elements are a Periodic Table of their atomic numbers.

D. the physical and chemical properties of the elements are a Periodic Function of the relative atomic mass.

The correct answer is option [B].

68. Which of the following is a property of transition elements?

[i] The elements are hard, dense metals with high melting and boiling points.

[ii] The elements often have several valencies.

[iii] Their compounds are often coloured.

[iv] The elements and their compounds often show catalytic properties.

A. [i] and [iii] only.

B. [i], [ii] and [iii].

C. [i], [ii], [iii] and [iv].

D. [ii], [iii] and [iv].

The correct answer is option [C].

69. The energy change that occurs when a gaseous atom acquires an electron to form a univalent negative ion is called _____

A. electronegativity.

B. ionization energy.

C. electron affinity.

D. thermal energy.

The correct answer is option [C].

70. The energy change which accompanies the addition of an electron to a gaseous atom is _____

A. atomization.

B. electron affinity.

C. electronegativity.

D. ionisation.

The correct answer is option [B].

71. Which of the following does not represent a valid set of quantum numbers for an orbital?

A. n = 4

l = 2

ml = -2.

B. n = 4

l = 4

ml = -3.

C. n = 4

l = O

ml = O.

D. n = 4

l = 1

ml = 1.

The correct answer is option [B].

72. Which of the following portion of the electromagnetic spectrum has the longest wavelength?

A. x-rays.

B. visible spectrum.

C. microwaves.

D. radio waves

The correct answer is option [D].

73. The electron configuration of carbon atom in its excited state is _____

[6C]

A. $1s^2\ 2s^2\ 2p_x^1\ 2p_y^1$.

B. $1s^2\ 2s^2\ 2p_x^2\ 2p_y^0$.

C. $1s^1\,2s^2\,2p_x^1\,2p_y^1\,2p_z^1$.

D. $1s^2\,2s^1\,2p_x^1\,2p_y^1\,2p_z^1$

The correct answer is option [D].

74. The ionic radii of non-metal are _____

A. smaller than the atomic radii.

B. equal to the atomic radii.

C. greater than the atomic radii.

D. none of the above.

The correct answer is option [C].

75. From the diagram drawn, the electronic configuration of element L in group 2 is _____

$_1$A							
		$_5$E					$_{10}$J
$_{11}$K	$_{12}$L					$_{17}$Q	

A. $1s^2 2s^2 2p^6 3s^2$.

B. $1s^2 2s^2 2p^6 3s^2 3p^2$.

C. $1s^2 2s^2 2p^6 3s^2$.

D. $1s^1 2s^2 2p^6 3s^2$.

The correct answer is option [A].

76. The periodic table is divided into _____

A. Eight periods and seven groups.

B. Seven groups and six periods.

C. Eight groups and eight periods.

D. Eight groups and seven periods.

The correct answer is option [D].

77. What happens to the size of an atom down a group?

A. Increases as the atomic number decreases.

B. Increases as the atomic number increases.

C. Decreases as the atomic number increases.

D. Decreases as the atomic number decreases.

The correct answer is option [B].

78. The groups are numbered from ____ to ____

A. 1, 8.

B. 0, 8.

C. 0, 7.

D. 1, 7.

The correct answer is option [C].

79. Which of the following elements is diatomic?

A. Iron.

B. Neon.

C. Oxygen.

D. Sodium.

The correct answer is option [C].

80. Which of the following is insoluble in water?

A. MgO.

B. P_4O_{10}.

C. K_2O.

D. N_2O3.

The correct answer is option [A].

81. Special properties of the transition elements are as a result of _____

A. ability to produce coloured ions.

B. ability to have variable valencies.

C. ability to possess partially filled d orbitals.

D. inert octet electrons.

The correct answer is option [C].

Reason: The partially filled d orbitals confer special properties on the transition elements.

The diagram drawn is a Periodic Table, in this table, Lithium and Helium have been put in their right place. The letters A - H represent elements whose symbols have not been used.

82. The element that forms a normal oxide in which the atomic ratio of the element and oxygen is 2:3 is _____

I	II	III	IV	V	VI	VII	VIII
							Helium
Lithium							
A	B	C	D	E	F	G	H

A. A.

B. B.

C. C.

D. D.

The correct answer is option [C].

83. When combining with non-metallic atoms, metallic atoms generally will _____

A. lose electrons and form negative ions.

B. lose electrons and form positive ions.

C. gain electrons and form negative ions.

D. gain electrons and form positive ions.

The correct answer is option [B].

Metals tend to lose electrons and form positive ions. A neutral atom of Li has 3 protons (+) and 3 electrons (-). If it loses an electron, the Li atom now has +3 and -2 or a net charge of +1.

84. The electronic configuration of 2422X ion is _____

A. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^2$.

B. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^1$

C. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$.

D. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$.

The correct answer is option [A].

85. In the Periodic table, what property decreases along the period and increases down the group?

A. Atomic number.

B. Ionization potential.

C. Electron affinity.

D. Atomic radius.

The correct answer is option [B].

86. The atomic numbers of the following elements T, X, Y, W and Z are 10, 11, 12, 14 and 15. What group and period is the element W found?

A. 2 and 4.

B. 4 and 3.

C. 6 and 2.

D. 4 and 2.

The correct answer is option [B].

Reason: From the group and period the element W is found in group 4 and period 3.

87. What happens to the size of an atom across a period?

A. Decreases as the atomic number decreases.

B. Increases as the atomic number decreases.

C. Increases as the atomic number increases.

D. Decreases as the atomic number increases.

The correct answer is option [D].

88. Which of the following statements is true of elements in the modern periodic table?

A. The elements are arranged in order of increasing mass number.

B. Sodium is a diatomic element.

C. Chlorine commonly forms monoatomic ions with a +1 charge.

D. Helium can exist as a monoatomic molecule.

The correct answer is option [D].

89. Which of the following elements is a d-block element?

A. Calcium.

B. Iron.

C. Lithium.

D. Silicon.

The correct answer is option [B].

90. From the diagram drawn, the most reactive metallic and non-metallic elements are _____

1 A							
		5 E					10 J
11 K	12 L					17 Q	

A. A and Q.

B. L and Q.

C. A, K, and Q.

D. A, L and Q.

The correct answer is option [C].

91. Which of the noble gases has the greatest ionization energy?

A. He.

B. Ar.

C. Xe.

D. Kr.

The correct answer is option [A].

92. Which set of elements contains a metalloid?

A. K, Mn, As, Ar.

B. Li, Mg, Ca, Kr.

C. Ba, Ag, Sn, Xe.

D. Fr, F, O, Rn.

The correct answer is option [A].

93. Which of the following electronic configurations represents an element that forms a monoatomic ion with a charge of -2?

A. $1s^2 2s^2$.

B. $1s^2 2s^2 2p^{2.}$

C. $1s^2 2s^2 2p^{4.}$

D. $1s^2 2s^2 2p^{6.}$

The correct answer is option [C].

94. Which of the following does not affect ionisation energy?

A. Atomic radius.

B. Nuclear charge.

C. Number of atomic shells.

D. Number of electrons in the outermost shell.

The correct answer is option [C].

95. The electronic configuration of 2 compounds x and y are as follows:

x= $1s^2 2s^2 2p^6 3s^1$
y = $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$.

Which of the statements below is true?

A. x belongs to group 1
y belongs to group 2.

B. x belongs to group 1
y belongs to group 8.

C. x belongs to group 2
y belongs to group 1.

D. x belongs to group 7
y belongs to group 2.

E. x belongs to group 3
y belongs to group 4.

The correct answer is option [A].

96. The electronic configurations of two elements X and Z are as follows:

X $1s^2 2s^2 2p^6 3s^1$

Z $1s^2 2s^2 2p^6 3s^2 3p^1$

Which of the following statements about X is correct?

A. X and Z both form anions readily

B. X forms anions and Z forms cations only

C. X forms cations and Z forms anions only

D. X and Z both form cations readily

The correct answer is option [D].

97. The correct electronic configuration of an element X with an atomic number 14 is _____

A. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^2$

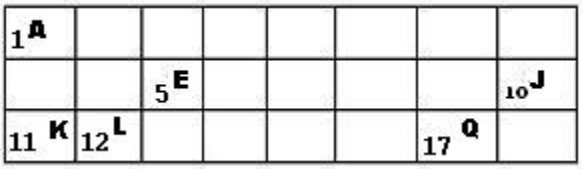
B. $1s^2 2s^2 2p^6 3s^2 3p^2$.

C.. $1s^2 2s^2 2p^6 3s^2 3p^3$.

D.. $1s^2 2s^2 2p^6 3s^2 3p^4$.

The correct answer is option [B].

98. From the diagram drawn, the element that is the alkaline earth metal is _____



A. A.

B. E.

C. L.

D. J.

The correct answer is option [C].

99. What is the number of protons (p), neutrons (n) and electrons (e) in the element $^{96}_{42}Mo^{3+}$?

A. 42p

42n

39e.

B. 42p

96n

39e.

C. 42p

54n

39e.

D. 42p

54n

45e.

The correct answer is option [C].

100. A given orbital is labelled with a quantum number ml = -2. Which of the following statements is correct?

A. The orbital could be within an s sub-level.

B. The orbital could be within a p or d sub-level.

C. The orbital could be within a d sub-level but not a p sub-level.

D. The orbital could be within an s or a p sub-level.

The correct answer is option [C].

101. The metallic bonds of metals _____

A. increases in strength down a group.

B. decreases in strength across a period.

C. decreases in strength down a group.

D. increases in strength across a period.

The correct answer is option [D].

102. Which of the following decreases from left to right across the period but increases down the group in the periodic table?

(I) Ionization energy.

(II) Electron affinity.

(III) Electronegativity.

(IV) Atomic radius.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [A]

103. Groups 3 to 0 make up the _____

A. p-block.

B. s-block.

C. d-block.

D. f-block.

The correct answer is option [A].

104. Ionization energy tends to _____

A. increase across a period and increase down a group.

B. decrease across a period and increase down a group.

C. decrease across a period and decrease down a group.

D. increase across a period and decrease down a group.

The correct answer is option [D].

105. The periodic table is an arrangement of the elements in increasing order of their _____

A. atomic weights.

B. atomic numbers.

C. mass numbers.

D. neutron/proton ratios.

The correct answer is option [B].

106. Calcium and magnesium belong to the same group in the periodic table because both _____

A. are metals.

B. form cations.

C. form colourless salts.

D. have the same number of valence electrons.

The correct answer is option [D].

107. The element 'X' does not usually form compounds with atoms of other elements. Which one of the following could be the electronic configuration of 'X'?

A. $1s^2 2s^1$.

B. $1s^2 2s^2 2p^6$.

C. $1s^2 2s^2 2p^3$.

D. $1s^2 2s^2 2p^1$.

The correct answer is option [B].

108. The periods are numbered from _____ to _____

A. 1, 7.

B. 1, 6.

C. 0, 6.

D. 0, 7.

The correct answer is option [A].

109. Which of the following describes the trends across the third period of elements (lowest to highest atomic number) in the periodic table?

A. The metallic characteristics increase.

B. The atomic size increases.

C. The number of the outermost energy level increases.

D. The electronegativity increases.

The correct answer is option [D].

110. Which one of the following is likely to be the formula of the most stable sulphide of aluminium (atomic number 13)?

A. AlS.

B. AlS_2 .

C. Al_2S_3.

D. Al_3S_2.

The correct answer is option [C].

111. Which of the elements in the following option form the f-block according to the arrangement of electron in the orbital?

A. Transition and Actinides elements.

B. Lanthanides and Transition elements.

C. Actinides and Lanthanides elements.

D. Lanthanides and active elements.

The correct answer is option [C].

112. _____ of a non-metal is larger than the atom from which it is formed.

A. An atom

B. An ion

C. A molecule

D. A proton

The correct answer is option [B].

113. Which element in group 15 has the strongest metallic character?

A. Bi.

B. As.

C. P.

D. N.

The correct answer is option [A].

From left to right across the period, metallic character decreases. But it increases going down a group (last element in a group will have the most metallic character). Bi is the last element in Group 15 so it is most metallic.

114. Which of the following is true of elements in the periodic table?

A. All elements in the same group have atoms with the same number of main electronic shells

B. The atoms of the elements are arranged in order of increasing number of electrons

C. The last number of each period is a noble gas

D. All of the above

The correct answer is option [D].

TOPIC: SEPARATION AND PURIFICATION OF CHEMICAL SUBSTANCES

DIRECTION: Choose the correct answer from the lettered options.

1. Water, ethanol, and diethyl ether have boiling points 100oC, 78oC, and 35oC respectively. The best method of separating them in a mixture is by _____

A. fractional crystallisation.

B. fractional distillation.

C. evaporation.

D. simple distillation.

The correct answer is option [B].

2. Which of the following characteristics of liquids given below is correct?

[i] It assumes the shape of the container with definite volume.

[ii] It is slightly compressible.

[iii] It expands slightly when heated

[iv] It can diffuse when placed in a container.

A. [i] only.

B. [i], [ii], [iii], and [iv].

C. [i] and [iv] only.

D. [i], [ii], and [iii] only.

The correct answer is option [D].

3. Which of the following is a compound?

A. Urine.

B. Soil.

C. Sand.

D. Blood.

The correct answer is option [C].

Sand: Silicon and oxygen.

4. The technique used for the separation of miscible liquids is by _____

A. the use of separating funnel.

B. distillation.

C. chromatography.

D. fractional distillation.

The correct answer is option [D].

A fractionating column is used in this method of separation.

5. Which of the following is the correct criteria to determine the purity of a substance?

[i] Melting point.

[ii] Boiling point.

[iii] A spot on a paper chromatogram.

A. [i] only.

B. [i], [ii], and [iii].

C. [ii] and [iii] only.

D. [i] and [ii] only.

The correct answer is option [B].

6. Which of the following characteristics of chemical changes given below are correct?

[i] It is not easily reversible because chemical bnds are formed

[ii] One or more new substances are formed

[iii] There is a change in mass of the original substances

[iv] There is a great amount of heat change.

A. [i] and [iv] only.

B. [i], [ii], and [iii].

C. [ii] and [iii] only.

D. [i], [ii], [iii] and [iv].

The correct answer is option [D].

7. The separation of a soluble solid from a solution involving heat is known as _____

A. precipitation.

B. evaporation.

C. fractional crystallization.

D. crystallization.

The correct answer is option [B].

This involves more vigorous or vehement heat.

8. An element is _____

A. a pure substance.

B. composed of two type of substance.

C. an impure substance.

D. a substance that can be split into simpler units by an ordinary chemical process.

The correct answer is option [A].

Composed of one type of substance with definite chemical composition and well defined properties.

9. The separation of a soluble solid which contains water of crystallization from a solution is known as _____

A. evaporation.

B. precipitation.

C. crystallization.

D. fractional crystallization.

The correct answer is option [C].

This involves mild heat not to deform the chemical constituent of the compound.

10. Which of the following methods is used in separating a mixture of palm wine and water?

A. Crystallization.

B. Decantation.

C. Distillation.

D. Filtration.

The correct answer is option [C].

11. The separation of soluble solids from a solution with different solubilities is known as _____

A. crystallization.

B. fractional crystallization.

C. precipitation.

D. evaporation.

The correct answer is option [B].

There is no heat involved.

12. Matter can be classified into _____, _____ and _____

A. elements, solid and gas.

B. solid, liquid and gas.

C. elements, compounds and mixtures.

D. solid, compounds and mixtures.

The correct answer is option [C].

13. If all the electrons are paired then it is _____

A. paramagnetic.

B. diamagnetic

C. neutral.

D. positive.

The correct answer is option [B].

14. The correct procedure for separating a mixture of sand, sodium chloride and ammonium chloride is _____, _____, _____ and _____

A. heat, add water, filter and evaporate.

B. heat, add water, evaporate and filter.

C. add water, filter and evaporate.

D. add water and evaporate.

The correct answer is option [A].

15. The following options are characteristics of compounds except _____

A. the properties are the sum of those of its individual constituents.

B. homogeneous.

C. the component substances are chemically bound together and cannot be separated by physical means.

D. the properties differ entirely from those of its component substances.

The correct answer is option [A].

This is the characteristics of mixtures

16. Who discovered the atom?

A. Rutherford.

B. Dalton.

C. Neils Bohr.

D. Goldstein.

The correct answer is option [B].

17. A sample of orange juice is suspected to have been contaminated with a yellow dye. Which of the following methods can be used to detect the dye?

A. Chromatography.

B. Decantation.

C. Distillation.

D. Evaporation.

The correct answer is option [A].

18. The method of seperating lead (II) and copper (II) ions by adding dilute hydrochloric acid is known as _____

A. chromatography.

B. crystallisation.

C. decantation.

D. precipitation.

The correct answer is option [D].

19. The technique used for the separation of immiscible liquids is _____

A. distillation.

B. chromatography.

C. the use of separating funnel.

D. fractional distillation.

The correct answer is option [C].

20. Which of the following is a mixture?

A. Hard soap.

B. Milk.

C. Sugar.

D. Sand.

The correct answer is option [B].

Milk: Water, sugar, fat, proteins, mineral salts and vitamins.

21. The separation of solutes from a solution is by _____

A. chromatography.

B. distillation.

C. fractional distillation.

D. the use of separating funnel.

The correct answer is option [A].

Different chromatograms [i.e. paper and gas/column] are used.

22. From the following methods of separating substances, select the most suitable separating method to obtain salt from sea water?

A. Fractional Distillation.

B. Evaporation.

C. Filtration.

D. Paper Chromatography.

The correct answer is option [B].

Solution: Separating insoluble solid from its solution.

23. From the following methods of separating substances, select the most suitable for separating a mixture of petrol and paraffin?

A. Evaporation.

B. Filtration.

C. Fractional Distillation.

D. Paper Chromatography.

The correct answer is option [C].

Solution: Petrol and Paraffin have different boiling points and a fractionating column is needed to separate the mixture.

24. Which of the following statements below is/are correct characteristics of solids?

[i] It is incompressible.

[ii] It expands slightly when heated.

[iii] It has definite shape and volume.

A. [ii] only.

B. [i] and [iii] only.

C. [i], [ii], and [iii].

D. [ii] and [iii] only.

The correct answer is option [C].

25. Which of the following option is not a chemical change?

A. the dissolution of metals and limestone in acids.

B. fermentation and decay of substances.

C. changes in the states of matter such as the sublimation of solids.

D. the addition of water to quicklime.

The correct answer is option [C].

This is a physical change.

26. Who discovered the nucleus and proposed the first atomic model?

A. J.J.Thomson.

B. Rutherford.

C. Max Plank.

D. Julius Plucker.

The correct answer is option [B].

27 From the following methods of separating substances, select the most suitable for separating the various colours in red rose petals?

A. Paper Chromatography.

B. Evaporation.

C. Filtration.

D. Fractional Distillation.

The correct answer is option [A].

Solution: The difference in solubilities of the solute in the solvent and the rate of diffusion of the particles makes for the use of paper chromatography.

28. You are given a mixture of xylene and a dilute aqueous solution of potassium chloride. Xylene boils 140°C. Xylene is immiscible with water. Which of the following methods would you use to separate the mixture as far as possible?

A. Filtration.

B. Use of a separating funnel.

C. Distillation.

D. Sublimation.

The correct answer is option [B].

Solution: After boiling to obtain the xylene in water since xylene is immiscible in water. Using a separating funnel can separate the xylene from the water

29. The separation of insoluble solid from a liquid using a filter paper is known as _____

A. decantation.

B. crystallization.

C. centrifugation.

D. filtration.

The correct answer is option [D].

The filter paper used is to obtain the residue which is the insoluble solid and filtrate which is the liquid.

30. The separation of insoluble solid from a liquid with a machine is called _____

A. Decantation.

B. Filtration.

C. Centrifugation.

D. Crystallization.

The correct answer is option [C].

The machined used for separation is a centrifuge.

31. A compound is _____

A. a substance which cannot be split into simpler units by an ordinary chemical process.

B. a substance which contains two or more elements chemically combined together.

C. composed of one type of substance with definite chemical composition and well defined properties.

D. composed of more than one type of substance separated from one another by physical methods.

The correct answer is option [B].

TOPIC: SHAPES OF MOLECULES AND SOLIDS

DIRECTION: Choose the correct answer from the lettered options.

1. The shapes of molecules include the following except _____

A. linear.

B. tetrahedral.

C. circular.

D. angular.

The correct answer is option [C].

2. The power of an atom in a molecule to attract electrons to itself is known as _____

A. electron affinity.

B. electronegativity.

C. electron cloud.

D. all of the above.

The correct answer is option [B].

3. The structure in which there is a particle at each corner and one in the centre of each face of the cube is known as _____

A. face-centred cubic.

B. hexagonal cubic.

C. simple cubic.

D. body-centred cubic.

The correct answer is option [A].

4. Why would you expect water and ethanol to mix easily because of the _____

A. hydrogen bonds.

B. van der Waals forces.

C. dipole-dipole attractions.

D. intermolecular forces.

The correct answer is option [A].

5. The attraction between the positive and negative ends of a polar molecule is called _____

A. Van der waals forces.

B. dipole-dipole attractions.

C. hydrogen bonding.

D. none of the above.

The correct answer is option [B].

6. Which of the following molecules has a linear shape?

A. CH_4.

B. CO_2.

C. H_2S.

D. NH_3.

The correct answer is option [B].

7. Which of these options is false about shapes of molecules/ions?

A. Methane is tetragonal.

B. Ammonium is tetragonal.

C. Ammonia is trigonal.

D. Water is linear molecule

The correct answer is option [D].

8. Which of the following molecules has a triple bond in its structure?

A. CH_4.

B. NH_3.

C. N_2.

D. O_2.

The correct answer is option [C].

9. These are intermolecular bonds or attractions except _____

A. metallic bond.

B. dipole-dipole attractions.

C. van der Waals forces.

D. hydrogen bond.

The correct answer is option [A].

10. These have linear molecule shapes except _____

A. Cl_2.

B. HCl.

C. CO_2.

D. H_2O.

The correct answer is option [D].

11.The major contribution of dipole to covalent molecule is to _____

A. confer partial ionic character.

B. confer partial non-polar character.

C. confer basic character.

D. confer acidic character.

The correct answer is option [A].

12. The tendency of the layers of metallic ions to slide over one another without shattering the crystal lattice is a characteristic of a metal which is _____ and _____

A. malleable, strong.

B. ductile, weak.

C. malleable, ductile.

D. metallic, metallic crystal.

The correct answer is option [C].

13. The following molecules contain hydrogen bonding except _____

A. ammonia.

B. ethanoic acid.

C. ethanol.

D. hydrogen fluoride.

The correct answer is option [C].

14. Dihydrogen monoxide is the chemical name for _____

A. hydrogen peroxide.

B. carbon monoxide.

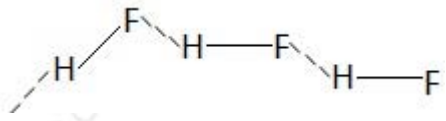
C. water.

D. carbon dioxide.

The correct answer is option [C].

Use the diagram to answer the question.

15. Which type of bond is represented by the dotted lines in the structure?



A. Covalent bond.

B. Dative bond.

C. Electrovalent bond.

D. Hydrogen bond.

The correct answer is option [D].

16. The following except _____ are factors that determine the polarity of a molecule.

A. the polarity of the ionic bond.

B. the number and position of lone pairs.

C. the shape of the molecule.

D. the polarity of the covalent bond.

The correct answer is option [A].

17. The following are factors responsible for the shapes of molecules except _____

A. overlapping of electrons during sharing of electrons.

B. Two unpaired electrons and a lone pair in its valence shell.

C. number of electron pairs in the valence shell of its central atom.

D. Two lone pairs and two unpaired electrons in its valence shell.

The correct answer is option [B].

18. Which of the following is an example of an ionic solid?

A. Graphite.

B. Copper (II) tetraoxosulphate (VI).

C. Sulphur (IV) oxide.

D. Naphthalene.

The correct answer is option [B].

19. All of these options with the exception of _____has no hydrogen bond.

A. NH_3.

B. HF.

C. H_2O.

D. CH_4.

The correct answer is option [D].

20. Which of the following is an example of a face centred cubic packing?

A. Aluminium.

B. Magnesium.

C. Lithium.

D. Sodium.

The correct answer is option [A].

21. Covalent molecules are directional because _____

A. there is sharing.

B. there is overlap of two atomic orbitals.

C. there is overlap of shared clouds.

D. most of them face x and y axes.

The correct answer is option [B].

Which of the following options is correct?

22. The force of attraction holding sulphur (IV) oxide is _____

A. hydrogen bonding.

B. dipole-dipole attractions.

C. van der Waals.

D. none of the above.

The correct answer is option [B].

23. Which of the following compounds has a three dimensional tetrahedral shape?

A. Benzene.

B. Carbon (IV) oxide.

C. Ethene.

D. Methane.

The correct answer is option [D].

24. Basic particles constituting different solids are _____

A. ions.

B. molecules.

C. atoms.

D. radicals.

The correct answer is option [D].

25. Crystal lattice is the _____

A. One dimensional arrangement of the particles.

B. Three dimensional arrangement of the particles.

C. Two dimensional arrangement of the particles.

D. none of the above.

The correct answer is option [B].

26. Polarization is _____

A. the unequal sharing of electrons by atoms of elements in a molecule.

B. the equal sharing of electrons by atoms elements in a molecule.

C. the loss and gain of electrons by atoms of elements in a molecule.

D. the sharing of electrons by atoms elements in a molecule.

The correct answer is option [A].

27. The following are factors which determine whether a molecule is polar or non-polar except _____

A. the shape of the molecule.

B. number of lone pairs in an atom.

C. the number of electronegative elements present.

D. polarity of the covalent bond.

The correct answer is option [C].

28. The forces existing between moleules are known as _____

A. Van der Waals forces.

B. molecular forces.

C. intermolecular forces.

D. interactive forces.

The correct answer is option [C].

29. The bonds in crystalline ammonium chloride are _____

A. covalent and dative.

B. ionic and covalent.

C. ionic, covalent and dative.

D. ionic, covalent and hydrogen bond.

The correct answer is option [A].

30. The following are examples of van der Waals forces except _____

A. naphthalene.

B. iodine.

C. dry ice.

D. hydrogen fluoride.

The correct answer is option [D].

31. _____ are made up of atoms joined to one another by covalent bonds to form a giant lattice.

A. Ionic solids

B. Molecular solids

C. Covalent solids

D. Metallic solids

The correct answer is option [C].

32. These are examples of unit cell cubic structure except _____

A. simple cubic structure.

B. non-linear cubic structure.

C. face-centered cubic structure.

D. body-centered cubic structure.

The correct answer is option [B].

33. The valence shell of water molecule contains _____

A. One lone pair and two unpaired electrons.

B. Two lone pairs and two unpaired electrons.

C. Two lone pairs and a single unpaired electrons.

D. single lone pair and a single unpaired electrons.

The correct answer is option [B].

34. The weak forces of attraction which are independent of normal bonding forces between non-polar molecules is known as _____

A. dipole-dipole attractions.

B. intermolecular forces.

C. molecular forces.

D. Van der Waals forces.

The correct answer is option [D].

35. The following are examples of substances which are deflected by a non-uniform electrostatic field except _____

A. water.

B. ethanol.

C. benzene.

D. trichloromethane.

The correct answer is option [C].

36. The structure in which there is a particle at each corner and one at the centre of the cube is known as _____

A. simple cubic.

B. face-centered cubic.

C. hexagonal cubic.

D. body-centered cubic.

The correct answer is option [D].

TOPIC: STATES OF MATTER

DIRECTION: Choose the correct answer from the lettered options.

1. A sample of gas exerts a pressure of 8.2 atm. when confined in a 2.93 dm^3 container at 20°C. The number of moles of gas in the sample is _____

A. 1.00.

B. 2.00.

C. 3.00.

D. 4.00.

The correct answer is option [A].

V = 2.93 dm^3, P = 8.20 atm., n =?, T =(20 + 273)K = 293K

R = 0.082 litre atm/deg mole

8.2 atm. x 2.93 dm^3 = n x 293 x 0.082 litre atm/deg mole

=> n = (8.2 x 2.93)/(293 x 0.082)

2. Helium is often used in observation balloons because it is _____

A. light and combustible.

B. light and non-combustible.

C. heavy and combustible.

D. heavy and non-combustible.

The correct answer is option [B].

3. The relative randomness of molecules in the states of matter is best indicated by _____

A. solids > liquids > gas.

B. liquid > gas > solid.

C. liquid > solid > gas.

D. gas > liquid > solid.

The correct answer is option [D].

A sample of orange juice is suspected to have been contaminated with a yellow dye.

4. Which of the following methods can be used to detect the dye?

A. Decantation.

B. Chromatography.

C. Distillation.

D. Filtration.

The correct answer is option [B].

5. 30 cm3 of hydrogen was collected over water at 27°C and 780mmHg. If the vapour pressure of water at the temperature of the experiment was 10mmHg, the volume of the gas at 760mmHg and 7°C is _____

A. 40.0$cm^{3.}$

B. 35.7$cm^{3.}$

C. 28.4$cm^{3.}$

D. 25.2$cm^{3.}$

The correct answer is option [C].

6. Boyles law can be expressed mathematically as _____

A. V a 1/P (T constant).

B. V1/T1 = V2/T2.

C. V a T (P constant).

D. P a V (T constant).

The correct answer is option [A].

7. Which of the following is not a basic postulate of the kinetic theory of gases?

A. Molecules in a gas have negligible volume.

B. Particles of a gas repel each other.

C. The gas particles have no attractive forces.

D. Pressure of a gas originates from the collision of the gas particles against the vessel walls.

The correct answer is option [B].

8. The following are true of compounds except that _____.

A. the component elements are chemically bounded together

B. the components are present in a fixed ratio by mass

C. the properties of the compound differ entirely from those of the component elements

D. it is either homogeneous or heterogeneous

The correct answer is option [D].

9. A mixture of 0.20 mole of Ar, 0.20 mole of N2 and 0.30 mole of He, exerts a total pressure of 2.1 atm. The partial pressure of He in the mixture is _____

A. 0.90 atm.

B. 0.70 atm.

C. 0.80 atm.

D. 0.60 atm.

The correct answer is option [A].

10. The phenomenon observed when dust particles collide randomly in a beam of sunlight is known as _____

A. tyndal effect.

B. diffusion.

C. osmosis.

D. Brownian movement.

The correct answer is option [A].

11. Complete combustion of wax by a candle flame would yield _____

A. water and carbon monoxide.

B. water and carbon dioxide.

C. carbon black and water.

D. carbon, hydrogen gas, oxygen gas.

The correct answer is option [B].

12. The common features between gas and paper chromatography include _____

A. static and moving phase.

B. stationary and moving phase.

C. long and short phase.

D. paper and chromatic phase.

The correct answer is option [B].

13. The Avogadro number of 24g of magnesium is the same as that of _____.

A. 1g of hydrogen molecules

B. 16g of oxygen molecules

C. 32g of oxygen molecules

D. 35.5g of chlorine molecules

The correct answer is option [B].

24g of Mg = 1 mole of Mg and 32g of O_2 = 1 mole of O_2

From Avogadro's Law,

14. A device used in the laboratory for intermittent production of gases without heating is _____

A. Liebig condenser.

B. aspirator.

C. delivery tube.

D. Kipp's apparatus.

The correct answer is option [D].

15. All pure samples of the same chemical compound contain the same elements in the same proportion by mass is a statement of _____

A. the law of conservation of matter.

B. the law of constant composition.

C. the law of multiple proportions.

D. Gay-Lussac's law.

The correct answer is option [B].

16. Which of the following is a colligative property?

A. Boiling point.

B. Freezing point.

C. Osmotic pressure.

D. Vapor pressure.

The correct answer is option [C].

17. Which of the following gases will rekindle a brightly glowing splint?

A. NO_2

B. NO

C. N_2O

D. Cl_2

The correct answer is option [C].

18. The following are characteristics of physical changes except _____

A. It is easily reversible.

B. No new substances are formed.

C. It is not easily reversible.

D. It does not involve any great heat change.

The correct answer is option [C].

19. Crystallization is most needed in _____

A. drug making.

B. cement making.

C. paint making.

D. perfume making.

The correct answer is option [A].

20. A substance is said to be pure if _____

(I) it is colourless.

(II) it is soluble in water.

(III) it's specific gravity is higher than 1.

(IV) it's melting point is sharp.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [C].

21. Which of these statements is true concerning solids?

A. Metallic solids tend to have low melting and boiling points.

B. The attractive forces are low between the atoms, ions, or molecules of a solid.

C. A crystalline solid has an ordered structure, while an amorphous solid has no ordered arrangement.

D. All of the above .

The correct answer is option [C].

22. The 'triple point' is _____

A. the combination of temperature and pressure at which the solid, liquid, and gas phases can co-exist at equilibrium.

B. the combination of temperature and pressure at which liquid, gas, and plasma phases all exist at equilibrium.

C. the combination of standard temperature, pressure, and volume.

D. the combination of temperature and pressure at which liquids and gases cannot be distinguished from each other.

The correct answer is option [A].

23. A pure solid usually melts _____

A. over a wide range of temperature.

B. over a narrow range of temperature.

C. at a lower temperature than that of an impure one.

D. at the same temperature as the impure one.

The correct answer is option [C].

24. Pure water can be best obtained from dirty river water by _____.

A. filtration

B. chromatography

C. sublimation

D. distillation

The correct answer is option [D].

25. PTotal = $P_1 + P_2 + P_3 + ... + Pn$, where PTotal is the pressure of a mixture of gases.

The equation above is an expression of _____

A. Graham's law.

B. Boyle's law.

C. Gay-Lussac's law.

D. Dalton's law.

The correct answer is option [D].

26. The technique that can be used to separate lead (II) chloride from water is _____.

A. chromatography.

B. distillation.

C. sieving.

D. crystallization.

The correct answer is option [C].

27. Separating funnel is used for separating a mixture of _____

A. liquids with different boiling points.

B. sediments in a liquid.

C. liquids with different colours.

D. liquids that are immiscible.

The correct answer is option [D].

A good example is a mixture of water and palm oil.

28. The following are characteristics of chemical changes except _____.

A. it is not easily reversible

B. it is easily reversible

C. there is a change in the mass of the substance used

D. a considerable amount of heat change is involved

The correct answer is option [B].

29. If 1.0 dm3 of gas X diffuses through a porous plug in 60 seconds while the same volume of hydrogen diffuses in 15 seconds under the same conditions, the relative molecular mass of X is _____

[H = 2]

A. 4.0g.

B. 8.0g.

C. 16g.

D. 32g.

The correct answer is option [D].

Solution: $t_1/t_2 = \sqrt{[M_1/M_2]}$, where t_1 = 60 secs, t_2 = 15 secs, M_1 = X, M_2 = H = 2; $^{60}/_{15} = \sqrt{[^X/_2]}$; $X = 4^2 \times 2 = 32g$

30. Sublimation is _____

A. the process from when a solid turns into a gas.

B. the process from when a gas turns into a solid.

C. the process from when a gas turns into a liquid .

D. the process from when a liquid turns into a gas.

The correct answer is option [A].

31. The method of collection of gas depends on it's _____

(I) boiling point.

(II) odour.

(III) density.

(IV) solubility.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [B].

32. Which one of the following is not a chemical change?

A. Burning natural gas.

B. Boiling an egg.

C. Corrosion of steel.

D. Distilling salt water solution

The correct answer is option [D].

33. According to the kinetic theory, an increase in temperature causes the kinetic energy of particles to _____

A. be zero.

B. remain constant.

C. increase.

D. decrease.

The correct answer is option [C].

34. What is the percentage by mass of sulphur in $Al_2(SO4)3$?

[$Al_2(SO4)3$ = 342 g/mol, S = 32g].

A. 9.36%.

B. 14.71%.

C. 21.3%/.

D. 28.07%.

The correct answer is option [D].

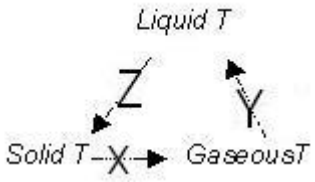
Molar mass of

$AL_2(SO_4)_3$ = 342 g/mol

Molar mass of sulphur = 32g

=>Percentage by mass of sulphur = [(32 x 3)/342] x 100%

35. Changes in the physical states of a chemical substance T, are shown in the schematic diagram drawn. The letters X, Y, Z respectively represent _____, _____ and _____



A. sublimation, condensation, and freezing.

B. sublimation, vapourization, and freezing.

C. evaporation, liquefaction and solidification.

D. liquefaction, vaporization and solidification.

The correct answer is option [A].

36. An emulsion paint consists of _____.

A. gas or liquid particles dispersed in liquid

B. liquid particles dispersed in liquid

C. solid particles dispersed in liquid

D. solid particles dispersed in solid

The correct answer is option [C].

37. O K is _____

(a) the freezing point of water.

(b) -273oC.

(c) zero Kelvins.

(d) -180oC.

A. b only.

B. a & c.

C. c & d.

D. a, b & c.

The correct answer is option [A].

38. Chromatography is used to separate components of mixtures, which differ in their rates of _____

A. diffusion.

B. migration.

C. reaction.

D. sedimentation.

The correct answer is option [D].

39. Molecules which are non-linear include _____

(I) methane.

(II) ammonia.

(III) hydrogen.

(IV) oxygen.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [A].

40. Which of the following is not a pure substance?

A. Molten sodium chloride.

B. Sodium chloride solution.

C. Sodium chloride solid.

D. Sodium chloride vapor.

The correct answer is option [B].

41. Which of the following options is the correct list of materials?

(I) Liquid oxygen

(II) Soap solution.

(III) Brass.

(IV) Silver.

(V) Petrol.

A. I, III and IV are elements.

B. II, III and V are mixtures.

C. III and IV are elements.

D. III and V are compounds.

The correct answer is option [B].

42. Dissolving salt in water is an example of which type of change?

A. Physical.

B. Nuclear.

C. Chemical.

D. Metallic.

The correct answer is option [A].

43. Which temperature scale is an absolute scale that also has its zero point as the lowest possible temperature?

A. Kelvin

B. Celsius

C. Fahrenheit

D. All of the above

The correct answer is option [A].

44. Pure solvents are obtained by _____

A. distillation.

B. condensation.

C. extraction.

D. evaporation.

The correct answer is option [A].

45. A mixture of oil and water can easily be separated by _____.

A. the use of a seperating funnel

B. evaporation

C. fractional crystallization

D. decantation

The correct answer is option [A].

46. In any chemical reaction, the total mass of the products is always equal to that of the reactants. This is a statement of the law of _____

A. definite proportions.

B. conservation of matter.

C. multiple proportions.

D. reciprocal proportions.

The correct answer is option [B].

47. Which of the following statements is correct about the average kinetic energy of the molecules of a gas?

A. It increases with increase in pressure.

B. It increases with constant pressure.

C. It increases with increase in temperature.

D. It increases with increase in volume.

The correct answer is option [C].

The average translational kinetic energy of gaseous molecules is directly proportional to temperature of the gas.

48. An emulsion is _____

A. another name for a solution of two miscible fluids.

B. a mixture of two immiscible fluids that is evenly mixed so that it is fairly homogenous.

C. formed when mixing two fluids that attract each other due to their polarity.

D. A and C.

The correct answer is option [B].

Cylinders A and B are identical. 20.0 g of O2 (molar mass = 32.0 g mol-1) is introduced into cylinder A and 20.0 g of N2 (molar mass = 28.0 g mol-1) is introduced into cylinder B. Both cylinders are then closed.

49. The temperature of _____

A. the gas pressure in the O2 cylinder is higher than that in the N2 cylinder.

B. the gas pressure in the O2 cylinder is lower than that in the N2 cylinder.

C. the gas pressure in the two cylinders is equal.

D. the pressures cannot be compared without knowing the temperature.

The correct answer is option [B].

50. The most suitable method used when separating an insoluble solid from a liquid is _____

A. evaporation.

B. filtration.

C. magnetization.

D. sublimation.

The correct answer is option [B].

51. Which type of change occurs when the size, shape, appearance, or volume of a substance is changed without changing its composition?

A. Chemical.

B. Physical.

C. Metallic.

D. Atomic.

The correct answer is option [B].

52. Which of these options is the odd one out?

A. Air.

B. Urine.

C. Brass.

D. Sand.

The correct answer is option [D].

Options A-C are mixtures while D is a compound

53. Which of the following are elements?

(a) Water

(b) Sugar

(c) Table salt (NaCl).

(d) The atmosphere.

A. a, d.

B. b, d.

C. b only.

D. none of the above.

The correct answer is option [D].

54. What volume of oxygen at s.t.p would react with carbon to form 4.40g of CO_2 according to the following equation?

$C_{(s)} + O_{2\ (g)} \rightarrow CO_{2\ (aq)}$

[O = 16, C = 12, 1 mole of a gas occupies 22.4 dm^3 at s.t.p.]?

A. 0.224 dm^3.

B. 2.24 dm^3.

C. 4.40 dm^3.

D. 4.48 dm^3.

The correct answer is option [B].

C + O2 → CO2

i.e 22.4 dm3 of oxygen is required to form 44g of CO2.

The volume of O2 required to produce 4.4g = X

therefore X = 4.4/44 x 22.4

55. Which of the following are chemical changes?

(a) Milk souring.

(b) Silver tarnishing.

(c) Butter melting.

(d) Coal burning.

A. a, b & d.

B. b, c & d.

C. a & b.

D. all of the above.

The correct answer is option [A].

56. The following statements are true of mixtures except _____.

A. the constituents are not chemically bounded

B. the constituents can be added together in any ratio by mass

C. the properties of the mixture are the sum of the individual constituents

D. it is always homogeneous

The correct answer is option [D].

57. Petrol and water mixture can be separated using _____

A. separating funnel.

B. evaporation.

C. chromatography.

D. decantation.

The correct answer is option [A].

58. If the temperature T°C of an ideal gas is increased to $(^3/_2)$T°C at constant volume V, its pressure P will change to _____

A. $(^2/_3)$P.

B. $P\left[\frac{(273 + \frac{3}{2}T)}{(273 + T)}\right]$

C. $(^3/_2)$P(273 + T).

D. $^{3P}/_{2T}$.

The correct answer is option [B].

From $^{P1}/_{T1} = {}^{P2}/_{T2}$

$T_1 = T^o + 273K$

$T_2 = {}^3/_2T^o + 273K$

$P_1 = P$

$P_2 = X$

$P/T^o + 273 = X/{}^3/_2T^o + 273$

P is calculated from the above equation.

59. Which of the following are units of volume?

(a) kJ.

(b) m3.

(c) atm.

(d) ml.

A. c & d.

B. b & d.

C. a, b & d.

D. b & c.

The correct answer is option [B].

60. The following are physical changes except _____

A. changes in the states of matter.

B. seperation of mixtures.

C. fermentation of substances.

D. demagnetization of iron.

The correct answer is option [C].

61. When an element can exist in two or more forms in the same physical state, the element is said to exhibit _____.

A. isotopy.

B. isomerism.

C. allotropy.

D. hygroscopy.

The correct answer is option [C].

62. Which of the following list below represents some common processes?

(I) Boiling of an egg.

(II) Rusting of iron.

(III) Distilling sea water.

(IV) Adding water to a solution of copper (II) sulphate.

A. All the listed processes are chemical changes

B. Only II is a chemical change

C. Only I and II are chemical changes.

D. Only II and IV are chemical changes.

The correct answer is option [C].

63. Which one of the following observations would not be evidence for a chemical reaction?

A. Formation of a precipitate.

B. Evolution of a gas.

C. Melting of a solid.

D. Colour change.

The correct answer is option [C].

64. Which of the following are heterogeneous compounds?

(a) Gold.

(b) Gasoline.

(c) A solution of ethanol and water.

(d) Water.

A. a, c.

B. b, c.

C. a, b, d.

D. none of the above.

The correct answer is option [D].

65. Which of the following movements can be described as a random motion?

A. A wheelbarrow being pushed.

B. A car traveling on a straight line.

C. Gas molecules colliding in a flask.

D. Planets going round the sun.

The correct answer is option [C].

66. Gas molecules are said to be perfectly elastic because _____

A. they collide without loss of energy.

B. they move about in straight lines.

C. the distances between them are negligible.

D. the volume occupied by them is negligible.

The correct answer is option [A].

67. The components of universal indicator can be best separated by _____

A. chromatography.

B. filtration.

C. evaporation.

D. crystallization.

The correct answer is option [A].

68. What is the temperature of a given mass of a gas initially at 0^0C and 9 atm., if the pressure is reduced to 3 atm. at a constant volume?

A. 91K.

B. 182K.

C. 273K.

D. 819K.

The correct answer is option [A].

P_1 = 9 atm, P2 = 3 atm, T_1 = 0°C = 273 K

$P_1/T_1 = P_2/T_2$

69. A _____ state of matter will undergo the same amount of expansion for a given increase in temperature.

A. solid

B. liquid

C. gas

D. all of the above

The correct answer is option [C].

70. A given quantity of gas occupies a volume of 228 cm^3 at a pressure of 750 mmHg. What will be it's volume at atmospheric pressure?

A. 220 cm^3.

B. 225 $cm^{3.}$

C. 230 $cm^{3.}$

D. 0.235 $cm^{3.}$

The correct answer is option [B].

It involves the application of the general gas law.

71. Equal volumes of all gases at the same temperature and pressure contain the same number of molecules is an expression of _____

A. Charles' law.

B. Boyle's law.

C. Graham's law.

D. Avogadro's law.

The correct answer is option [D].

72. A saturated solution of potassium chloride was prepared at X°C. If 30 cm^3 of this solution required 22.5 cm^3 of silver trioxonitrate (V) solution, containing 34 g in 100 cm^3 solution, for complete precipitation, the solubility of potassium chloride at X°C in mol dm^{-3} is _____.

[take KCl = 74.5, $AgNO_3$ = 170]

A. 1.5 mol dm^{-3}.

B. 2.0 mol dm^{-3}.

C. 0.15 mol dm^{-3}.

D. 0.20 mol dm^{-3}.

The correct answer is option [A].

Solution: Find the molarity = mass concentration/molar mass of $AgNO_3$ = $^{34}/_{0.1}$ = 340 g dm^{-3}

$^{340}/_{170}$ = 2mol dm^{-3}

Write the equation of reaction = $AgNO_3 + KCl \rightarrow AgCl + KNO_3$; The number moles of the reactants is 1 mole of $AgNO_3$ and 1 mole KCl; $M_1V_1/C_1 = M_2V_2/C_2$, where M_1 = molarity of KCl =? V_1 = 30cm_3, M_2 = molarity of $AgNO_3$ = 2 mol dm^{-3}, V_2 = 22.5cm^3, C_1 = C_2 = 1 mole; M_1 = 2 x 22.5/30 = 1.5 mol dm^{-3}.

73. _____ can be used to separate mixtures of solids of various sizes.

A. Rusting

B. Sieving

C. Sublimation

D. Coarsing

The correct answer is option [B].

74. The volume of a balloon containing a certain amount of an ideal gas at 5.0 atm pressure is V1 litres at 25°C. Which of the following will be the volume, V2, of the balloon if the temperature is kept constant and the pressure changed?

A. $V_1 = V_2 \times 2$

B. $V_2 = V_1 \times 0.5$.

C. $V_2 = V_1 \times (273+25)$

D. $V_2 = V_1 \times {}^{1}/_{(273)}$

The correct answer is option [B].

75. A sample of juice is suspected to have been contaminated with a yellow dye. Which of the following methods can be used to detect the dye?

A. Decantation.

B. Chromatography.

C. Distillation.

D. Filtration.

The correct answer is option [B].

76. A liquid begins to boil when _____

A. it's vapour pressure is equal to the vapour pressure of it's solid at the given temperature.

B. molecules start escaping from it's surface.

C. it's vapor pressure equals the atmospheric pressure.

D. it's volume is slightly ionic.

The correct answer is option [C].

basic postulate of the kinetic theory of gases is that the molecules of a gas move in straight lines between collisions.

77. This implies that _____

A. collisions are perfectly elastic.

B. forces of repulsion exist.

C. forces of repulsion and attraction are in equilibrium.

D. collisions are inelastic.

The correct answer is option [A].

78. Which of the following is a measure of the average kinetic energy of the molecules of a substance?

A. Volume.

B. Pressure.

C. Mass.

D. Temperature.

The correct answer is option [D].

79. The formation of water from oxygen and hydrogen is an example of a _____ change.

A. chemical

B. physical

C. atomic

D. nuclear

The correct answer is option [A].

80. Which of the following gases is colourless, odourless and soluble in potassium hydroxide solution?

A. NO_2.

B. SO_2.

C. NH_3.

D. CO_2.

The correct answer is option [D].

Examples are H_2CO_3, CH_3COOH etc

81. Separation of mixture of solids by physical methods can be based on differences in the following except _____

A. melting point.

B. solubility.

C. particle size.

D. molar mass.

The correct answer is option [D].

Nature of matter/Separation techniques

82. The ratio of the initial to the final pressure of a given mass of gas is 1 : 1.5. The final volume of the gas is _____, if the initial volume was 300cm^3 at the same temperature.

A. 120cm^3.

B. 200cm^3.

C. 450cm^3.

D. 750cm^3.

The correct answer is option [B].

Now, P_1 = 1, P_2 = 1.5, V_1 = 300cm^3, V_2 =?

83. The following methods are tests for purity except _____

A. melting point.

B. centrifugation.

C. boiling point.

D. temperature.

The correct answer is option [B].

84. In one mole of hydrogen H_2, the Avogadro's number is _____.

A. H atoms

B. electrons

C. H_2 molecules

D. neutrons

The correct answer is option [C].

85. Fractional distillation is a method of separating _____

A. crude oil.

B. liquid-liquid mixture.

C. coal.

D. mixture of different solubility in a liquid.

The correct answer is option [D].

86. Which of the following substances is a mixture?

A. Sulphur powder.

B. Bronze.

C. Distilled water.

D. Ethanol.

The correct answer is option [B].

Bronze is an alloy of copper and Tin

87. Which of the following statements are correct of the gaseous state?

(I) The intermolecular spaces are very large.

(II) The molecules move very fast.

(III) The intermolecular forces are negligible.

(IV) The intermolecular space can be compressed.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [D].

88. The ideal gas equation can be written as _____

A. $PV = nRT$.

B. $P_1V_1 = P_2V_2$

C. $V_2 = {}^{(P_1V_1T_1)}/_{(P2T2)}$.

D. $P_1V_1T_1 = P_2V_2T_2$

The correct answer is option [A].

89. If 20 cm3 of distilled water is added to 80 cm^3 of 0.50 mol dm^{-3} hydrochloric acid, the concentration of the acid will change to _____

A. 0.20 mol dm^{-3}.

B. 0.40 mol dm^{-3}.

C. 2.00 mol dm^{-3}.

D. 5.00 mol dm^{-3}.

The correct answer is option [B].

C_1= 0.50 mol dm^{-3}, C_2 =? V_1 = 80cm^3

V_2 = (80 + 20) cm^3 = 100 cm^3

C_2 = 0.5 × 80/100

= 0.4

90. At a given temperature and pressure a gas, A, diffuses twice as fast as a gas, B. It follows that _____

(I) gas B is heavier than gas A.

(II) Gas B is four times as heavy as gas A.

(III) Gas B is monoatomic.

(IV) Gas A is diatomic.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [A].

91. Which of the following are pure substances?

(a) Wine.

(b) Water.

(c) Blood.

(d) Iron.

A. b, d.

B. b, c, d.

C. b only.

D. d only.

The correct answer is option [A].

92. Which of the following statements is not correct?

A. A chemical change is irreversible and a new substance is formed

B. A physical change is reversible and no new substances are formed

C. separating a mixture by distillation is an example of a physical change

D. The addition of water to quicklime is an example of a physical change

The correct answer is option [D].

TOPIC: STOICHIOMETRY AND CHEMICAL REACTIONS

DIRECTION: Choose the correct answer from the lettered options.

1. According to the given balanced chemical reaction below, how many grams of oxygen are produced when 29.20g of water is decomposed?

$2H_2O\ (l) \rightarrow 2H_2(g) + O_2(g)$

A. 2.595g

B. 25.95g

C. 32.85g

D. 3.285g

The correct answer is option [B]

2. On heating 20g sample of hydrated salt, $Na_2CO_3.XH_2O$, strongly, 5.5g of the anhydrous salt was obtained, what is the value of x in the hydrated salt solved from one of the expressions?

A. $\frac{5.5}{20} = \frac{106}{106 + 18X}$

B. $\frac{20}{5.5} = \frac{106}{106 + 18X}$

C. $\frac{106}{5.5} = \frac{20}{106 + 18X}$

D. $\frac{106}{5.5} = \frac{18X}{20}$

The correct answer is option [A]

3. Which of the following options has the largest mass of carbon per gram?

A. H_2CO_3

B. CH_3CO_2H

C. CH_3OH

D. CH_3CH_2OH

The correct answer is option [D]

4. A compound has an empirical formula of $NPCl_2$ and a molecular weight of 347.66. What is its molecular formula?

A. $NPCl_2$

B. $N_2P_2Cl_2$

C. $N_3P_3Cl_6$

D. You cannot determine the molecular formula from this information.

The correct answer is option [C]

5. An excess of a divalent metal M was dissolved in a limited volume of hydrochloric acid. If 576 cm^3 of hydrogen were liberated at s.t.p., what was the mass of the metal that produced this volume of hydrogen?

(M = 24, H = 1, molar volume of a gas at s.t.p. = 22.4 dm^3)

A. 617.14g

B. 6.174g

C. 0.6174g

D. 61.74g

The correct answer is option [C]

6. What is the balanced equation for Mg and CO_2?

A. $2Mg + CO_2 \rightarrow Mg_2O + CO$

B. $Mg + CO_2 \rightarrow MgO_2 + C$

C. $2Mg + CO_2 \rightarrow 2MgO + C$

D. $Mg + CO_2 \rightarrow MgO + CO$

The correct answer is option [C]

7. A metal X with relative atomic mass 56 forms an oxide with formula X_2O_3. How many grams of the metal will combine with 10g of oxygen?

(O = 16)

A. 23.52g

B. 11.76g

C. 35g

D. 17.5g

The correct answer is option [A]

8. Calculate the number of moles of magnesium chloride produced by reacting 168g of magnesium trioxocarbonate (IV) with excess hydrochloric acid.

(Mg = 24, C = 12, O = 16, H = 1, Cl = 35.5)

A. 4m

B. 3m

C. 2m

D. 1m

The correct answer is option [C]

9. Find the mass concentration of 1 mol dm^{-3} potassium hydroxide solution.

(K = 39, H = 1, O = 16, N = 14, Na = 23, C = 12)

A. 56g

B. 56g dm^{-3}

C. 55g

D. 56mol dm^{-3}

The correct answer is option [B]

10. One atom of an element has a mass of 9.123 x 10^{23}g. There is only one isotope of the element. The element is _____.

A. argon

B. magnesium

C. chromium

D. manganese

The correct answer is option [D]

11. A gas occupies a volume of 30.0 dm^3 at s.t.p. What volume in dm3 would it occupy at 91°C and 380 mmHg?

A. 40dm^3.

B. 80dm^3.

C. 100dm^3.

D. 112dm^3.

The correct answer is option [B].

Using the equation
$P_1V_1/T_1 = P_2V_2/T_2$
where P_1 = 760mmHg, V_1 = 30.0 dm^3, T_1 = 273K
P_2 = 380mmHg, V_2 =? dm^3, T_2 = (91 + 273)K

12. The balanced chemical equation for the reaction of copper (Cu) and sulfuric acid (H_2SO_4) is given below;

$Cu(s) + H_2SO_4(aq) \rightarrow CuSO_4(s) + H_2(g)$

how many grams of $CuSO_4$ would be produced from 128.00g of copper metal?

A. 217.30g

B. 318.51g

C. 162.43g

D. 432.53g

The correct answer is option [B]

13. Volumetric analysis may be used in the determination of the following except _____.

A. molar mass of a metal acid or base

B. percentage purity or impurity of a given salt solution

C. solubility of a substance in aqueous medium

D. water of crystallization of anhydrous salt solution

The correct answer is option [D]

14. A further 26.0 ml of water is added to 402.89 ml of water. What is the final volume (stated to four significant figures)?

A. 428 ml.

B. 428.9 ml.

C. 429 ml.

D. 429.89 ml.

The correct answer is option [B].

15. When solute B is added to pure solvent A _____

A. the vapour pressure of A above the solvent remains unchanged.

B. the vapour pressure of A above the solvent decreases.

C. the vapour pressure of A above the solvent increases.

D. none of the above.

The correct answer is option [B].

16. The mass of carbon in grams needed to reduce 15.9g of copper (II) oxide is _____

[Copper = 63.5, O = 16]

A. 1.20

B. 2.40

C. 2.50

D. 2.56

The correct answer is option [B].

17. Which of the following options has the greatest mass?

A. 200 molecules of water

B. 100 atoms of Fe

C. 200 molecules of O_2

D. 200 molecules of CH_4

The correct answer is option [C]

18. A solution of trioxonitrate (V) acid contained 0.67g in 100cm^3. 31.0cm^3 of this solution neutralized 25 cm3 of a sodium trioxocarbonate (IV) solution. Calculate the concentration of the trioxocarbonate (IV) solution.

(HNO_3 = 63, Na_2CO_3 = 106)

A. 0.066M

B. 0.131M

C. 0.00066M

D. 0.00131M

The correct answer is option [A]

19. 12g of a mixture of anhydrous sodium trioxocarbonate (IV), Na_2CO_3, and sodium chloride, NaCl, were made up to 1dm^3 of aqueous solution 25cm^3 of this mixture were neutralized by 20cm^3 of 0.2M hydrochloric acid, HCl. Find the percentage purity of the trioxocarbonate (IV) sample.

(Na_2CO_3 = 106, HCl = 36.5)

A. 45.3%

B. 70.7%

C. 90.6%

D. 77.5%

The correct answer is option [B]

20. A balanced chemical equation obeys the law of _____

A. conservation of mass.

B. definite proportions.

C. multiple proportions.

D. conservation of energy.

The correct answer is option [A].

The law of conservation of matter states that matter can neither be created nor destroyed in a chemical process

21. A solution of sodium trioxocarbonate (IV) contains 10.6g in 250 cm^3 of solution. Calculate the concentration of the solution.

[Na_2CO_3 = 106.0]

A. 0.4 mol dm^{-3}.

B. 1.0mol dm^{-3}.

C. 10.6mol dm^{-3}.

D. 25.0mol dm^{-3}.

The correct answer is option [A].

22. If a hydrated salt weighs x grams and water recovered after strong heating in y grams, the formula for determining the percentage of water of crystallization is _____.

A. $\frac{x}{y} \times \frac{100}{1}\%$

B. $\frac{y}{x} \times \frac{100}{1}\%$

C. 100x%

D. $\frac{y}{x} \times \frac{100}{1}\%$

The correct answer is option [B]

23. 12g of a mixture of anhydrous sodium trioxocarbonate (IV), Na_2CO_3, and sodium chloride, NaCl, were made up to $1dm^3$ of aqueous solution 25 cm^3 of this mixture were neutralized by $20cm^3$ of 0.2M hydrochloric acid, HCl. Calculate the mass of the sodium chloride impurity.

(Na_2CO_3 = 106, HCl = 36.5)

A. 26.5g

B. 3.52g

C. 8.48g

D. 16.96g

The correct answer is option [B]

24. If the fertilizers listed below are priced according to their nitrogen content, which will be the least expensive per 50g. bag?

A. Urea $(NH_2)2CO$

B. Ammonia NH_3

C. Ammonium nitrate NH_4NO_3

D. Guanidine $HNC(NH_2)2$

The correct answer is option [C]

25. 12.5g of zinc trioxocarbonate (IV), $ZnCO_3$, were heated very strongly to a constant mass and the residue treated with excess hydrochloric acid, HCl. Calculate the mass of zinc chloride, $ZnCl_2$, that would be obtained.

(Zn = 65, C = 12, O = 16, H = 1, Cl = 35.5)

A. 13.6g

B. 10.05g

C. 20.1g

D. 27.2g

The correct answer is option [D]

26. If 14.8g of a salt dissolved in 250cm^3 of distilled water with a concentration of 0.80 $moldm^{-3}$. The molar mass of salt in $gmol^{-1}$ is _____

A. 74.0.

B. 13.5.

C. 14.8.

D. 47.4.

The correct answer is option [A].

27. A solution of trioxonitrate (V) acid contained 0.67g in 100cm^3. 31.0cm^3 of this solution neutralized 25cm^3 of a sodium trioxocarbonate (IV) solution. Calculate the mass of the trioxocarbonate (IV) solution.

(HNO_3 = 63, Na_2CO_3 = 106)

A. 13.89g

B. 0.06996g

C. 6.996g

D. 0.1389g

The correct answer is option [C]

28. Avogadro's number can be defined as the number of _____

(I) molecules in 22.4dm3 of a gas at s.t.p.

(II) Molecules in one mole of a compound.

(III) Electrons in 96500 coulombs of electricity.

(IV) Electrons in the outermost.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [A].

29. What mass of anhydrous sodium trioxocarbonate (IV), Na2CO3, is present in 500 cm3 of 0.1 mol dm-3?

(Na = 23, C = 12, O = 16)

A. 10.6g

B. 21.2g

C. 5.3g

D. 106g

The correct answer is option [C]

30. The balanced chemical equation for the reaction of nitrogen (N_2) and hydrogen (H_2) to form ammonia (NH_3) is given below;

$N_2 + 3H_2 \rightarrow 2NH_3$

how many grams of hydrogen would be required to react with 14.0g of nitrogen?

A. 1.0g

B. 6.0g

C. 27.0g

D. 2.0g

The correct answer is option [B]

31. Which of the following gases contains the highest number of atoms at s.t.p?

A. 6 moles of neon.

B. 3 moles of oxygen.

C. 2 moles of chlorine.

D. 1 mole of ethane.

The correct answer is option [D].

32. What is a molar solution?

A. Molar solution of a compound is one which contains the molar weight of a molecule in one dm^3 of the solution.

B. Molar solution of a compound is one which contains the relative atomicolecular mass of a compound in one dm^3 of the solution.

C. Molar solution of a compound is one which contains the molar mass of a molecule in one dm^3 of the solution.

D. Molar solution of a compound is one which contains the molar mass of a compound in one dm^3 of the solution.

The correct answer is option [D]

33. Which of the following options is correct about the figure 1000?

(a) It contains four significant figures.

(b) It is the number of grams in a kilogram.

(c) It is equal to 1.000 x 104.

(d) It is the product of $(2.000 \times 10^{-4})(5.000 \times 107)$.

A. a, b, and c.

B. a and b.

C. b, c, and d.

D. b and c.

The correct answer is option [B].

34. What is element Y in the following equation?

$^{14}_{7}N + ^{4}_{2}He \rightarrow ^{1}_{1}H + Y$

A. Fluorine.

B. Sodium.

C. Chlorine.

D. Oxygen.

The correct answer is option [D].

35. Under which of the following reaction conditions will Mg be the limiting reagent of the following chemical reaction?

$Mg_{(s)} + I_{2(s)} \rightarrow MgI_{2(s)}$

A. 200 atoms of Mg and 160 molecules of I_2

B. 0.16 mol Mg and 0.25 mol I_2

C. 100 atoms of Mg and 100 molecules of I_2

D. 0.12 mol Mg and 0.08 mol I_2

The correct answer is option [B]

36. What volume of oxygen in dm^{-3} would be required to burn completely 8.0g of methane according to the equation below?

$CH_4(g)$

$+ 2O_2(g)$

$\rightarrow CO_2(g) + 2H_2O(g)$

(Molar volume = $22.4dm^3$, C = 12, H = 1)

A. 2.8.

B. 5.6.

C. 11.2.

D. 22.4.

The correct answer is option [D].

37. In a certain reaction, 0.20g of hydrogen gas combines with 3.20g of oxygen gas. If the relative molecular mass of the compound is 34.0, find its molecular formula.

(H = 1, O = 16)

A. H_2O

B. HO_2

C. H_2O_2

D. HO

The correct answer is option [C]

38. What phenomenon does this equation show?

$Na_2CO_3.10H_2O \rightarrow Na_2CO_3.H_2O + 9H_2O$

A. Deliquiscence

B. Hygroscopy

C. Efflorescence

D. Decomposition

The correct answer is option [C]

39. What volume of steam is produced when 10g of propyne is burnt in excess oxygen at s.t.p.?

A. 44.8dm

B. $11.2dm^3$

C. $22.4dm^3$

D. $11.2cm^3$

The correct answer is option [B]

40. 39.8g of a mixture of potassium chloride, KCl, and potassium trioxochlorate (V), KClO3, were heated to a constant mass. If the residue weighed 28.9g, what was the percentage mass of the potassium chloride in the mixture?

(K = 39, Cl = 35.5, O = 16)

A. 72.6%

B. 27.4%

C. 38.8%

D. 53.4%

The correct answer is option [A]

The balanced chemical equation for the reaction of zinc sulfide and oxygen is given below:

$2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$

41. How many molecules of zinc oxide would be produced when 23.5 g zinc sulfide is heated with excess oxygen?

A. 3.42×10^{23}

B. 1.46×10^{23}

C. 4.65×10^{23}

D. 2.82×10^{23}

The correct answer is option [B]

42. An organic compound contains 40.0% carbon, 6.7% hydrogen and 53.3% oxygen. What is the empirical formula of the compound?

[O = 16.0, C = 12.0, H = 1.0]

A. C_2HO.

B. CHO.

C. CH_2O.

D. CHO_2.

The correct answer is option [C].

43. The balanced chemical equation of the reaction of iron (Fe) and chlorine (Cl2) gas is given below;

$2Fe + 3Cl_2 \rightarrow 2FeCl_3$

how many molecules of iron (III) chloride are formed from 55.85 g of iron?

A. 1.024×10^{23}

B. 1.024×10^{24}

C. 6.00×10^{24}

D. 6.00×10^{23}

The correct answer is option [D]

44. $3Cu + pHNO_3 \rightarrow 3Cu(NO_3)2 + 4H_2O + xNO$

In the equation above, the values of p and x respectively are _____ and _____

A. 6, 2.

B. 1, 3.

C. 8, 2.

D. 2, 3.

The correct answer is option [C].

45. What is the volume occupied by 2 moles of ammonia at s.t.p?

A. 44.8 dm^{-3}.

B. 22.4 dm^{-3}.

C. 11.2 dm^{-3}.

D. 5.6 dm^{-3}.

The correct answer is option [A].

46. Which of the following apparatus can be used to measure accurately a specific volume of a liquid?

A. Beaker.

B. Conical flask.

C. Measuring cylinder.

D. Pipette.

The correct answer is option [D].

47. What is the percentage of carbon in two moles of calcium hydrogen trioxocarbonate (IV)?

[Ca = 20, H = 1, C = 12, O = 16]

A. 7.4.

B. 11.9.

C. 14.9.

D. 29.8.

The correct answer is option [C].

48. Which of the following equations illustrates substitution reaction?

(I) $2CH_3CH_2OH + 2Na \rightarrow 2CH_3CH_2ONa + H_2$
(II) $C_2H_2 + 2CuCl \rightarrow C_2Cu_2 + 2HCl$
(III) $C_2H_2 + 2AgNO_3 \rightarrow C_2Ag_2 + 2HNO_3$
(IV) $Cu_2C_2 + H_2 \rightarrow C_2SO_4 + C_2H_2$

A. I & II

B. III & IV

C. I, II & III

D. I, II, III & IV

The correct answer is option [C].

A substitution reaction is one in which an atom or compound replaces another in a compound.

$Na_2CO_{3(s)} + 2HCl_{(aq)}$

$\rightarrow 2NaCl_{(aq)} + H_2O_{(l)} + CO_2(g)$

49. Using the equation above, what volume of carbon (IV) oxide in dm^3 measured at s.t.p. is liberated when 36g of sodium trioxocarbonate (IV) is dissolved in hydrochloric acid?

(1mole of gas occupies $22.4dm^4$ at stp)

{Na = 23, C = 12, O = 16}

A. 7.6.

B. 11.5.

C. 22.4.

D. 44.8.

The correct answer is option [A].

50. These are volumetric analysis tools except _____

A. indicator

B. deflagrating spoon

C. white background for example white tile

D. wash bottle

The correct answer is option [B]

51. Find the volume of oxygen produced by 1 mole of potassium trioxochlorate (V) at s.t.p. in the following reaction.

$KClO_{3(s)} \rightarrow KCl_{(s)} + O_{2(g)}$

A. 14.93 dm^3

B. 11.2 dm^3

C. 22.4 dm^3

D. 33.6 dm^3

The correct answer is option [D]

52. What is the balanced equation for; $KClO_3$ to potassium chloride and oxygen?

A $KClO_3 \rightarrow KCl + O_3$

B. $2KClO_3 \rightarrow 2KCl + 3O_2$

C. $2KClO_3 \rightarrow 2KCl + 2O_3$

D. $2KClO_3 \rightarrow KCl_2 + 2O_2 + KO_2$

The correct answer is option [B]

53. Which of the following is not a unit of concentration?

A. %w/w.

B. Molality.

C. Molarity.

D. Mole.

The correct answer is option [D].

54. When the equation given below is balanced, how many moles of water will be produced for each mole of calcium phosphate?

__ $Ca(OH)_{2(aq)}$ + __$H_3PO_{4(aq)}$ → __$H_2O_{(g)}$ + __$Ca_3(PO_4)_{2(s)}$

A. 1

B. 2

C. 6

D. 10

The correct answer is option [C]

55. Which of the following is dependent on temperature?

A. Molality.

B. Molarity.

C. Mole fraction.

D. %w/w.

The correct answer is option [B].

56. What volume in cm^3 of 0.2 mol dm^{-3} HCl will neutralize 25cm^3 of 0.2 mol dm^{-3} NaOH?

A. 5.0.

B. 12.5.

C. 25.0.

D. 40.0.

The correct answer is option [C].

57. According to the equation given below, how many molecules of oxygen are produced by the decomposition 43.0 g of potassium chlorate?

$2KClO_3 \rightarrow 2KCl + O_2$

A. 1.06×10^{23}

B. 6.82×10^{23}

C. 12.3×10^{22}

D. 1.46×10^{24}

The correct answer is option [A]

58. One mole of $(NH_4)_2Cr_2O_7$ contains _____

A. One mole of nitrogen.

B. Four moles of hydrogen.

C. One mole of chromium.

D. Seven moles of oxygen.

The correct answer is option [D]

59. Which of the following statements are true?

A. 1 mol H atoms = 6.02×10^{23} H atoms.

B. The formula mass of O2 = 32.00 amu.

C. 6.02 x 1023 H atoms have a mass of 1.008 g.

D. All of the above are true.

The correct answer is option [D]

60. Which of the following statements is correct of ΔH, the enthalpy of reaction?

i. It is the heat change accompanying a chemical reaction.

ii. It is negative for exothermic reactions.

iii. It is positive for endothermic reactions.

A. i only.

B. ii and iii only.

C. iii only.

D. i, ii and iii.

The correct answer is option [D].

TOPIC: STRUCTURE OF THE ATOM

DIRECTION: Choose the correct answer from the lettered options.

1. The number of electrons in the valence shell of an element of atomic number 14 is _____

A. 1.

B. 2.

C. 3.

D. 4.

The correct answer is option [D].

2. Which of the following has neither mass nor charge?

A. Alpha particle.

B. Deuterium.

C. Gamma rays.

D. Neutron.

The correct answer is option [C].

3. Pauli's exclusion principle is related to _____

A. quantum numbers of electrons.

B. reversibility of equilibrium reactions.

C. electronegativity values of elements.

D. collision theory of reaction states.

The correct answer is option [A].

4. What brings about emission of visible and ultraviolet radiation from atoms?

A. Electrons changing from higher to lower energy levels.

B. Electrons changing from lower to higher energy levels.

C. Electrons moving about the atoms within an orbital.

D. The atoms condensing from a gas to a liquid or solid.

The correct answer is option [A].

5. Which of the following sets of coefficients gives the correct values for the coefficients w, x, y, z in the following equation

$wAl + xFe_3O_4 \rightarrow yAl_2O_3 + zFe$

A. 8 3 4 9.

B. 2 3 2 1.

C. 1 3 2 1.

D. 1 4 3 2.

The correct answer is option [A].

6. How many sp hybrid bonds can be associated with a central atom?

A. 1.

B. 2.

C. 3.

D. 4.

The correct answer is option [B].

7. What is the nuclear symbol for the isotope of oxygen which has 9 electrons?

A. $^{16}_{8}O$.

B. $^{17}_{8}O$.

C. $^{18}_{8}O$.

D. $_{18}{}^{9}O$.

The correct answer is option [D].

8. The mass of an individual electron is of the order of _____.

A. $9.1 \times 10^{-31}g$

B. $6x10^{23}g$

C. 1/2000g

D. $9.1 \times 10^{-31}Kg$

The correct answer is option [D].

The specific charge for an electron is $1.76 \times 10^{11}C\ Kg^{-1}$; The charge of an electron is $1.6 \times 10^{-19}C$. The mass of an electron = charge/specific charge = $9.1 \times 10^{-31}Kg$.

9. ${}^{14}_{7}N + X \rightarrow {}^{17}_{8}O + {}^{1}_{1}H$

In the above reaction, X is a _____

A. neutron.

B. lithium atom.

C. helium atom.

D. deuterium atom.

The correct answer is option [C].

10. How many protons, neutrons, and electrons does ${}^{7}_{4}Be^{2+}$ have?

A. 4, 3, 2.

B. 4, 3, 4.

C. 4, 3, 6.

D. 4, 6, 3.

The correct answer is option [A].

11. The knowledge of half-life can be used to _____

A. create an element.

B. detect an element.

C. split an element.

D. irradiate an element.

The correct answer is option [B].

12. Example of an element that can catenate is _____

A. carbon.

B. nitrogen.

C. bromine.

D. chlorine.

The correct answer is option [A].

13. The following are uses of radioactive isotope except _____.

A. determining equilibrium positions

B. tracing reaction paths

C. dating elements

D. radiography

The correct answer is option [A].

14. The total number of subatomic particles in $^{31}_{15}P$ is _____

A. 31.

B. 16.

C. 46.

D. 51.

The correct answer is option [C].

15. Li^{+} has _____ electrons.

A. 0.

B. 1.

C. 2.

D. 3.

The correct answer is option [C].

16. The energy required to remove the most loosely bound electron from an atom in the gaseous state is known as _____

A. bond energy.

B. ionization energy.

C. potential energy.

D. activation energy.

The correct answer is option [B].

17. Which of the following denotes an alpha particle?

A. $^{1}_{0}n$.

B. $^{4}_{2}He$

C. . $^{0}_{-1}e$.

D. $^{9}_{4}Be$.

The correct answer is option [B].

Alpha rays are fast moving streams of charged particles.

18. Scientists whose experiments gave evidence about the nature and include _____

(I) J.J. Thompson.

(II) Lord Rutherford.

(III) Le¢ Chatelier.

(IV) Robert Boyle.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [A].

19. Identify the hybrid orbital that would contain an electron with the highest energy.

A. sp.

B. sp^2.

C. sp^3.

D. sp^{3d}.

The correct answer is option [D].

20. When a nuclear change takes place, which is true?

A. Energy is destroyed.

B. Energy is released.

C. Energy is unchanged.

D. Energy does not occur.

E. Energy is variable.

The correct answer is option [B].

21. To change L^i to Li^+, you need to _____

A. add one electron.

B. remove one proton.

C. remove one electron.

D. add one proton.

The correct answer is option [C].

22. Which of the following pairs of elements is most likely to form a covalent compound?

A. Sodium and oxygen.

B. Phosphorus and oxygen.

C. Copper and chlorine.

D. Cesium and iodine.

The correct answer is option [B].

23. $^{235}_{92}U + {}^{1}_{0}n \rightarrow {}^{145}_{56}Ba + {}^{88}_{36}Kr + 3{}^{1}_{0}n$ + energy

The radiation reaction represented by the equation above is _____

A. an alpha particle emission.

B. an endothermic reaction.

C. a thermal ionization.

D. nuclear fission.

The correct answer is option [D].

Nuclear Fission is a nuclear reaction in which a heavy nucleus is split into two fragments with a large release of energy.

24. Two atoms X and Y have electronic configurations shown below;

X: $1s^2 2s^2 2p^6 3s^1$
Y: $1s^2 2s^2 2p^6 3s^2 3p^5$

Which of the following is the best description of the bond formed between the two of them?

A. Covalent, with formula XY.

B. Covalent, with formula XY_2.

C. Ionic, with formula X_2Y.

D. Ionic, with formula XY.

The correct answer is option [D].

25. In which of the following crystals are the particles held by Van der Waal's forces?

A. Sodium chloride.

B. Ice.

C. Diamond.

D. Iodine.

The correct answer is option [D].

Van der Waal's forces are intermolecular forces (attraction) present in diatomic gases such as Nitrogen, Oxygen, Chlorine etc. It is also present in iodine which is solid at room temperature.

26. The existence of two or more forms of the same element in the same physical state is known as _____

A. allotropy.

B. resonance.

C. hybridization.

D. isotopy.

The correct answer is option [A].

27. Cancerous growth are cured by exposure to _____.

A. g- rays.

B. b- rays.

C. a- rays.

D. x- rays.

The correct answer is option [A].

28. Which of the following sets of coefficients gives the correct values for the coefficients w, x, y, z in the following equation?

w $Cu_{2(aq)}$ + x $I_{(aq)}$ → y $CuI_{(s)}$ + z $I_{2(s)}$

A. 2 4 2 1.

B. 2 2 1 1.

C. 1 1 1 1.

D. 1 4 2 2.

The correct answer is option [A].

29. Millikan's contribution to the development of atomic theory is the determination of _____.

(I) charge on electron

(II) Charge -to- mass ratio

(III) Positive rays

(IV) Cathode rays

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [C].

cylinder X contains 0.8 mol of CO_2 and another identical cylinder Y contains 0.8 mol of CO gas.

30. Which of the following statements is correct?

A. The number of molecules of the gas in X is greater than that in Y.

B. The number of molecules of the gas in X is lower than that in Y.

C. The number of molecules of the gas in X is the same as that in Y.

D. The information given in the question is not sufficient to allow comparison of the number of molecules of the gases in the two cylinders.

The correct answer is option [C].

31. _____ instrument was used in the discovery of proton.

A. Cathode ray tube

B. Glass tube

C. Discharge tube with central cathode

D. Discharge tube with terminal cathode

The correct answer is option [C].

32. Weak attractive forces which exists even between discrete molecules are known as _____.

A. van der Waals forces

B. hydrogen forces

C. metallic forces

D. coordinate covalent forces

The correct answer is option [A].

33. $^{14}_{6}C$ and $^{12}_{6}C$ are examples of carbon _____

A. ions.

B. isotopes.

C. valences.

D. molecules.

The correct answer is option [B].

34. Which of the following best describes the formation of an ionic bond between atoms of two elements?

A. Sharing pairs of electrons between the atoms.

B. Sharing of valence crystals in the ionic crystal lattice of the compound of the two elements.

C. Transfer of electrons between atoms.

D. Formation of dipole-dipole forces between the atoms.

The correct answer is option [C].

35. The empirical formula of a hydrocarbon containing 0.12mole of carbon and 0.36mole of hydrogen is _____.

A. CH_2

B. CH_3

C. C_2H_2

D. C2H4

The correct answer is option [B]. C

H<p>

0.12

0.36<p>

divide both by the smallest number which is 0.12mole

C

H

$(^{0.12}/_{0.12})$

$(^{0.36}/_{0.12})$

C(1)

H(3)<p>

36. Nuclear reactions can be used in the following except _____

A. gauging the thickness of objects.

B. making atomic bombs.

C. traveling to the moon.

D. generating electricity.

The correct answer is option [C].

37. Which of the following pairs of subatomic particles have essentially the same mass?

A. Neutrons and electrons.

B. Anion and cation.

C. Protons and neutrons.

D. Protons and electrons.

The correct answer is option [C].

38. What are the values of x and y in the following equation?

$^{234}_{90}Th \rightarrow {}^{y}_{x}Pu$ + b-particle, where b-particle = $^{0}_{1}e$

A. x = 91

y = 234.

B. x = 92

y = 235.

C. x = 89

y = 236.

D. x = 88

y = 238.

The correct answer is option [A].

39. **Which of the following is true about the information concerning elements 'A' and 'B'?**

Elements	No of protons	No of neutrons	No of electrons
A	23	24	22
B	23	23	23

A. A is cation and B is a neutral atom.

B. They are neutral isotopes of the same element.

C. They are two different elements.

D. They are both ions of the same element.

The correct answer is option [A].

40. Which of the following provides the best description of an isotope?

A. Atoms with the same number of protons but differing numbers of electrons.

B. Atoms with the same mass number but differing atomic numbers.

C. Atoms with the same mass numbers and the same atomic numbers.

D. Atoms with the same atomic numbers but differing mass numbers.

The correct answer is option [D]

41. $^{14}_{6}C$ has _____ protons.

A. 6.

B. 14.

C. 12.

D. 10.

The correct answer is option [A].

42. The emission of an alpha particle during the decay of uranium 238 is an example of a _____ change.

A. chemical

B. physical

C. nuclear

D. atomic

The correct answer is option [C].

43. An atomic-level species is found to contain 16 protons, 16 neutrons and 18 electrons. This species is best described as _____

A. an atom of sulphur (S).

B. an isotope of sulphur.

C. a cation of sulphur.

D. an anion of sulphur.

The correct answer is option [D].

44. The greatest weakness of Rutherford's atomic model lies in the fact that his theory _____.

A. looked like the solar system

B. did not explain how an electron moving in an orbit around the nucleus radiates energy and eventually disappears into the nucleus

C. did not make use of quantum theory in the interpretation of the model

D. did not make use of emission spectra in the interpretation of the model

The correct answer is option [B].

45. When an atom gains an electron, it becomes _____

A. chemically inactive.

B. negatively charged.

C. positively charged.

D. a cation.

The correct answer is option [B].

Electron acceptors are usually negatively charged e.g. $Cl + e^- \rightarrow Cl^-$

46. Fe^{2+} and Fe^{3+} are different iron _____

A. atoms.

B. elements.

C. isotopes.

D. ions.

The correct answer is option [D].

47. Which of the following pairs of elements would be expected to form an ionic compound when they combine?

A. Sulphur and oxygen.

B. Phosphorus and oxygen.

C. Magnesium and aluminium.

D. Magnesium and sulphur.

The correct answer is option [D].

48. A radioactive solid is best stored _____

A. under paraffin oil.

B. under ultraviolet light.

C. in a cool, dark cupboard.

D. in a box lined with lead.

The correct answer is option [D].

A lead block absorbs gamma rays which has the most penetrating power when compared with others.

49. Li^{+} and Cu^{2+} are examples of _____

A. anions.

B. cations.

C. isotopes.

D. molecules.

The correct answer is option [B].

50. The following are electromagnetic waves except _____.

A. white light

B. photon

C. x-ray

D. infra-red

The correct answer is option [B].

Species 'A' has the valence electron configuration of s^2 and 'B' has the valence electron configuration of s^2p^5.

51. Which of the following is the most likely formula of a compound formed between 'A' and 'B'?

A. A^2B.

B. AB.

C. A^2B^3.

D. AB^2.

The correct answer is option [D].

52. The smallest particle of a substance that can exist as an entity of its own and has the chemical and physical characteristics of that substance is _____.

A. an element

B. a molecule

C. an atom

D. a mole

The correct answer is option [B].

53. Which of the following statements is correct?

A. The dipole-dipole intermolecular forces between NH_3 molecules are stronger than those between PH_3 molecules.

B. The dispersion intermolecular forces between NH_3 molecules are stronger than those between PH_3 molecules

C. The N-H bond in NH_3 is stronger than the P-H bond in PH_3

D. The N-H bond in NH_3 is weaker than the P-H bond in PH_3

The correct answer is option [A].

[$KHCO_3$ = 100gmol-1].

54. If the solubility of $KHCO_3$ is 0.40 $moldm^{-3}$ at room temperature, the mass of $KHCO^3$ in100cm^3 of the solution at this temperature is _____.

A. 4.0g.

B. 10.0g.

C. 40.0g.

D. 100.0g.

The correct answer is option [C].

1 mole of $KHCO_3$ has a mass of 100g

Therefore 0.40 mole = 100 x 0.40 = 40g.

55. What is emitted during the disintegration of barium nucleus as shown by the equation below?

$^{138}_{56}Ba \rightarrow {}^{134}_{54}Xe$?

A. Alpha particles.

B. Beta particles.

C. Gamma rays.

D. Neutrons.

The correct answer is option [A].

56. Which of the following describes the region of space in a particular energy level where an electron is most likely to be found?

A. A shell.

B. An electron configuration.

C. An orbit.

D. An orbital.

The correct answer is option [D].

57. The standard element with which chemists define relative atomic mass is _____

A. carbon-12.

B. carbon-13.

C. hydrogen-3.

D. carbon-14.

The correct answer is option [A].

58. The mass number of an atom of an element is the sum of it's _____

A. electrons, neutrons and protons.

B. electrons and protons.

C. protons and neutrons.

D. orbital electrons.

The correct answer is option [C].

59. Given only the atomic number of an element, it is possible to determine the number of _____

(I) protons in it's nucleus.

(II) unpaired electrons present.

(III) electrons in it's outermost shell.

(IV) neutrons in it's nucleus.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [D].

60. Radon is used as a tracer in medical research because it _____

A. is monoatomic.

B. is radioactive.

C. is a noble gas.

D. has a complete valence shell.

The correct answer is option [B].

Radioactivity is the spontaneous emission of radiation by the atoms of an unstable element.

61. When a solution contains more of the solute than is present in a saturated solution at that particular temperature it is called a _____ solution.

A. concentrated

B. supersaturated

C. unsaturated

D. colloidal

The correct answer is option [B].

62. The position of an element in the periodic table is determined by _____

A. it's density.

B. it's atomic radius.

C. it's relative atomic mass.

D. the number of protons in it's atom.

The correct answer is option [D].

63. The empirical formula of an organic compound is CH2O. Its molar mass is 60.0 g mol-1 What is its molecular formula?

[Atomic mass, g mol-1: C = 12.0; H = 1.0; O = 16.0]

A. CH_2O.

B. $C_2H_4O_2$.

C. $C_3H_6O_3$.

D. $C_4H_8O_4$.

The correct answer is option [B].

(C + 2H + O)n = 60

(12 + 2 + 16)n = 60

30n = 60

n = 2

$(CH_2O)2 = C_2H_4O_2$

64. Hydrogen is used for the following except _____

A. manufacturing of ammonia.

B. synthesis of hydrochloric acid.

C. extinguishing fire.

D. conversion of coal to petrol.

The correct answer is option [C].

65. Which of these is the correct formulas for various compounds written by a student?

[I] Copper (I) sulphate – Cu_2SO_4.

[II] Sodium sulphite - Na_2S.

[III] Aluminium phosphate - $AlPO_4$.

[IV] Calcium nitrate - $CaNO_3$.

[V] Sodium chloride - NaCl.

66. What is the symbol for an ion which has 8 protons and 10 electrons?

(I) N^{3-}

(II) O^{2-}

(III) O^{3-}

(IV) F^{-}

The correct answer is option [B].

A. All are correct formulae

B. Only I, II and III are correct.

C. Only I, III and V are correct

D. Only II and III are correct.

The correct answer is option [C].

67. Matter is made up of basic building blocks called _____.

A. elements

B. moles

C. states

D. atoms

The correct answer is option [D].

68. If an atom of an element X is represented as

1s, which of the following deductions are correct?

(I) X is chemically inactive.

(II) An atom of X has two neutrons.

(III) An atom of X has only one shell.

(IV) X belongs to period one of the periodic table.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [D].

69. How many valence electrons (bonding and non-bonding) are present in a molecule of water?

A. 4.

B. 6.

C. 8.

D. 20.

The correct answer is option [C].

70. In which of the following are radioactive isotopes used?

(I) Scientific research.

(II) Sterilization of equipment.

(III) Dating techniques.

(IV) Treatment of cancer.

A. I & II.

B. III & IV.

C. I, II & III.

D. I, II, III & IV.

The correct answer is option [D].

71. Which of the following best describes the molecular property that expresses the ease with which the electron density in a neutral atom can be distorted?

A. Electronegativity.

B. Polarizability.

C. Polarity.

D. Van der Waals force.

The correct answer is option [B].

72. What is the mass number of an element if its atom contains 10 protons, 10 electrons and 12 neutrons?

A. 32.

B. 22.

C. 20.

D. 10.

The correct answer is option [B].

Mass number is the sum of the number of protons and neutrons in an atom.

73. An isotope of phosphorus (atomic number 15) whose mass number is 32 is used in compounds to treat leukemia. How many neutrons are in this isotope?

A. 32.

B. 15.

C. 17.

D. 16.

The correct answer is option [C].

74. A compound contains 31.91% of potassium, 28.93% of chlorine and the rest, Oxygen. What is the chemical formula of the compound?

[K = 39, Cl = 35.5, O = 16].

A. $KClO_3$.

B. $KClO_4$.

C. KClO.

D. $KClO_2$.

The correct answer is option [A].

K = 31.91 Cl =
28.93
O = 39.16
39
35.5
16
K = 0.82 Cl =
0.82
O = 2.45
0.82
0.82
0.82
K = 1, Cl = 1, O = 3

75. An atom is the smallest part of _____.

A. a substance.

B. a compound.

C. an element.

D. a lattice.

The correct answer is option [C].

76. The basic particles from which matter could be formed include the following except _____

A. molecules.

B. atom.

C. ion.

D. all of the above.

The correct answer is option [D].

77. A solid has a melting point of 1440°C. The solid conducts electricity. It does not dissolve in water or non-polar solvents. Which of the following describes the bonding between the atoms in the solid?

A. Both covalent and dipole-dipole.

B. Ionic.

C. Covalent.

D. Metallic.

The correct answer is option [D].

78. In which of the following substances would you expect the bonding to be most ionic?

A. hydrogen chloride gas

B. ice

C. solid lead bromide

D. diamond

The correct answer is option [C].

79. Which of the following gives the types of orbitals found in period 3 of the periodic table?

A. s orbitals only.

B. s and p orbitals.

C. s, p and d orbitals.

D. s, p and f orbitals.

The correct answer is option [C].

80. Which type of radiation is unaffected by magnetism?

A. Alpha.

B. Beta.

C. Gamma.

D. Helium.

The correct answer is option [C].

81. N^{3-} has _____

A. 7 protons and 4 electrons.

B. 7 protons and 10 electrons.

C. 7 protons and 11 electrons.

D. 8 protons and 11 electrons.

The correct answer is option [B].

82. Find X in the given equation: 146C → X + b

A. $^{13}_{6}C$.

B. $^{14}_{7}N$.

C. $^{12}_{5}B$.

D. $^{12}_{6}C$.

The correct answer is option [B].

83. Which of the following cannot be deduced from the electronic configuration of a transition metal?

A. Possession of magnetic properties.

B. Ability to form complex ions.

C. Position in the periodic table.

D. Variable oxidation states.

The correct answer is option [A].

84. _____ atomic particle was discovered as a result of the bombardment of beryllium sheet using alpha particle.

A. Neutron

B. Positron

C. Proton

D. Electron

The correct answer is option [A].

TOPIC: WATER. SOLUTIONS. SOLUBILITY

DIRECTION: Choose the correct answer from the lettered options.

1. When sols solidify under certain conditions _____ is formed.

A. aerosols

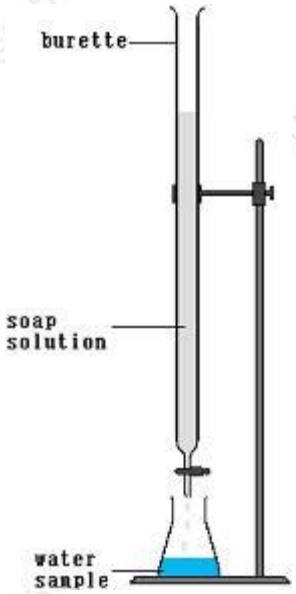
B. emulsion

C. gels

D. none of the above

The correct answer is option [C].

2. The diagram drawn is an experiment to _____



A. treat water.

B. find out that hydrogen burns in air.

C. demonstrate tyndall effect.

D. compare hardness of various samples of water.

The correct answer is option [D].

3. A common solvent of sulphur is _____

A. water.

B. carbon (iv) sulphide.

C. alcohol.

D. ethanoic acid.

The correct answer is option [B].

4. Fluoride ions are sometimes added in the treatment of town water supply in order to _____

A. improve coagulation.

B. kill germs and bacteria.

C. make the water tasteful.

D. prevent tooth decay.

The correct answer is option [D].

5. Solute is to true solution as _____ is to colloids.

A. dispersion medium

B. dispersion phase

C. crystalloids

D. aerosols

The correct answer is option [D].

6. The loss of molecules of water of crystallization to the atmosphere by some crystalline salts is known as _____

A. efflorescence.

B. effervescence.

C. phosphorescence.

D. fluorescence.

The correct answer is option [A].

7. _____ of a solute is the number of moles of solute required to form a saturated solution in 1dm3 of the solvent at a particular temperature and in the presence of undissolved solute.

A. Solution

B. Saturated solution

C. Supersaturated solution

D. Solubility

The correct answer is option [D].

8. Substances which dissolves endothermically would be _____

A. less soluble at higher temperatures.

B. more soluble at lower temperatures.

C. more soluble at higher temperatures.

D. less soluble at lower temperatures.

The correct answer is option [C].

9. Dehydration of a substance is best described as _____

A. the removal of moisture.

B. the addition of water.

C. the addition of moisture.

D. the removal of the elements of water.

The correct answer is option [D].

10. When a crystal was added to it's solution, it did not dissolve and the solution remained unchanged showing that the solution was _____

A. concentrated.

B. saturated.

C. unsaturated.

D. colloidal.

The correct answer is option [B].

11. Solubility varies with _____

A. pressure.

B. volume of solvent.

C. temperature.

D. volume of solute.

The correct answer is option [C].

12. The solubility of alcohols in water is due to _____

A. their covalent nature.

B. hydrogen bonding.

C. their low boiling point.

D. their ionic character.

The correct answer is option [B].

13. To test for water, _____ and _____ are added to water.

A. anhydrous copper [II] trioxocarbonate [IV] and cobalt [II] chloride.

B. anhydrous copper [II] tetraoxosulphate [VI] and cobalt [II] chloride.

C. hydrated copper [II] tetraoxosulphate [VI] and cobalt [II] oxide.

D. hydrated copper [II] trioxocarbonate [IV] and cobalt [II] oxide.

The correct answer is option [B].

14. A freshly boiled starch is a typical example of _____

A. an aerosol.

B. an emulsion.

C. a sol.

D. a solution.

The correct answer is option [C].

15. _____ is one which can dissolve more solute at a given temperature.

A. Suspension

B. Saturated solution

C. Supersaturated solution

D. Unsaturated solution

The correct answer is option [D].

16. Temporary hardness of water is removed by the use of the following except _____

A. Boiling.

B. Use of $Ca(OH)_{2.}$

C. Use of $Na_2CO_{3.}$

D. Use of alum.

The correct answer is option [D].

17. Potassium trioxocarbonate [IV] was saturated out of a solution of mass 63.28g. Find the concentration in moles per dm^3 of the solute of mass 12.30g.

[k = 39, C = 12, O = 16, volume of water = 1000cm3].

A. 1.41mol/dm^3.

B. 1.14mol/dm^3.

C. 1.57mol/dm^3.

D. 1.75mol/dm^3.

The correct answer is option [D].

Solution: Mass of Solution = 63.28g

Mass of solvent = 50.98g

Mass of solute = 12.30g

Note: 1g of water = 1cm^3 of water; molar mass of K_2CO_3

K = 39 x 2 = 78

C = 12

O = 16 x 3 = 48

No of moles of K_2CO_3 = mass/molar mass = 12.30/138 = 0.0891 moles.

Therefore, 50.98g of water saturated by 0.0891 mole of K_2CO_3

1000cm^3 of water will be saturated by 1000 x 0.0891/50.98mol of K_2CO_3 = 1.75mol/dm^3.mol/dm^3.

18 Coffee stains are removed with _____

A. turpentine.

B. ammonia.

C. borax in water.

D. petrol.

The correct answer is option [C].

19. A true solution is _____

A. when a solute dissolves in a solvent and their particles are homogeneous.

B. when a solute dissolves in a solvent and their particles are heterogeneous.

C. when a solute dissolves in a solvent and their particles settle at the bottom of a container.

D. none of the above.

The correct answer is option [A].

20. Distilled water is different from deionized water because _____

A. distilled water is a product of condensed steam while deionized water filtered laboratory water.

B. distilled water is always pure and sold in packs while deionized water not packed for consumption.

C. distilled water is a condensed steam but deionized water is produced using exchange resins which absorb undesired ions.

D. distilled water is man-made while deionized water is both natural and artificial.

The correct answer is option [C].

21. Which of the following cannot be used to soften permanently hard water?

A. Calcium hydroxide.

B. Distillation.

C. Sodium carbonate.

D. An ion exchange resin.

The correct answer is option [A].

22. The concentration of a saturated solution varies with the following except _____

A. volume.

B. solute.

C. solvent.

D. temperature.

The correct answer is option [A].

23. A saturated solution is a solution _____

A. in which the solute is in equilibrium with the solvent.

B. in which the solute saturated the solution.

C. the solvent can still accept more solute except when the temperature is lowered.

D. whose solvent has low solubility at a given temperature.

The correct answer is option [B].

24. When liquid particles are dispersed in a solid medium it is called _____

A. gels.

B. emulsions.

C. aerosols.

D. sols.

The correct answer is option [B].

25. A graph of solubility against temperature is called _____

A. sigmoid curve.

B. supernant curve.

C. solubility curve.

D. dispersion curve.

The correct answer is option [C].

26. If 12.2g of lead [II] tetraoxosulphate [VI] were dissolved in 21g of distilled water at 20oC, calculate the solubility of the solute in mol dm^{-3}.

[Pb = 207, S = 32, O = 16, Volume of water = 1000cm^3].

A. 1.92mols/dm^3.

B. 19.2mols/dm^3.

C. 2.02mols/dm^3.

D. 20.2mols/dm^3.

The correct answer is option [A].

Solution: Note: 1g of water = 1cm^3 of water

Molar mass of PbSO4 = Pb = 27

S = 32

O = 16 x 4 = 64 = 303

No of moles = mass/molar mass = 12.2/303 = 0.0403moles

21g of water at 20°C dissolved 0.0403 moles of $PbSO_4$

1000cm^3 of water at 20°C dissolved 1000 x 0.0403/21 = 1.92moles/dm^3.

27. Solubility decreases with _____

A. an increase in temperature.

B. a decrease in the volume of solute.

C. a decrease in the temperature.

D. an increase in the volume of solute.

The correct answer is option [C].

28. Substances which dissolves exothermically would be _____

A. more soluble at lower temperatures.

B. more soluble at higher temperatures.

C. less soluble at lower temperatures.

D. less soluble at higher temperatures.

The correct answer is option [A].

29. The following are physical properties of water except _____

A. turns to ice when cooled below 0oC.

B. high boiling point.

C. solid water contracts when heated.

D. solid water is less dense than liquid water.

The correct answer is option [A].

30. When water reacts chemically with a compound to form at least two products the reaction is called _____

A. hydration.

B. dehydration.

C. hydrolysis.

D. drying.

The correct answer is option [C].

31. The following are characteristics of colloids except _____

A. Tyndall effect on light beam.

B. solid phase are removed by dialysis.

C. colloidal particles are larger than that of suspensions.

D. colloidal particles are separated using parchment membranes.

The correct answer is option [C].

32. Hard water contains a number of dissolved salts which include _____

A. sodium tetraoxosulphate [VI], magnesium tetraoxosulphate [VI] and calcium hydrogentrioxocarbonate [IV].

B. calcium trioxocarbonate [IV], magnesium tetraoxosulphate [VI] and calcium tetraoxosulphate [VI].

C. calcium tetraoxosulphate[VI], magnesium trioxocarbonate [IV] and calcium hydrogentrioxocarbonate [IV].

D. calcium tetraoxosulphate [VI], magnesium tetraoxosulphate [VI] and calcium hydrogentrioxocarbonate [IV].

The correct answer is option [D].

33. Treated town water undergoes the following steps except _____

A. coagulation.

B. sedimentation.

C. precipitation.

D. chlorination.

The correct answer is option [C].

34. Which of the following methods removes temporary hardness of water?

[i] boiling and slaked lime.

[ii] washing soda and slaked lime.

[iii] zeolite and caustic soda.

[iv] washing soda and caustic soda.

A. [i] & [iii].

B. [i] only.

C. [ii] & [iv].

D. [i], [ii], [iii] & [iv].

The correct answer is option [B].

35. Tyndall effect is when _____

A. solutes are dialyzed in solution.

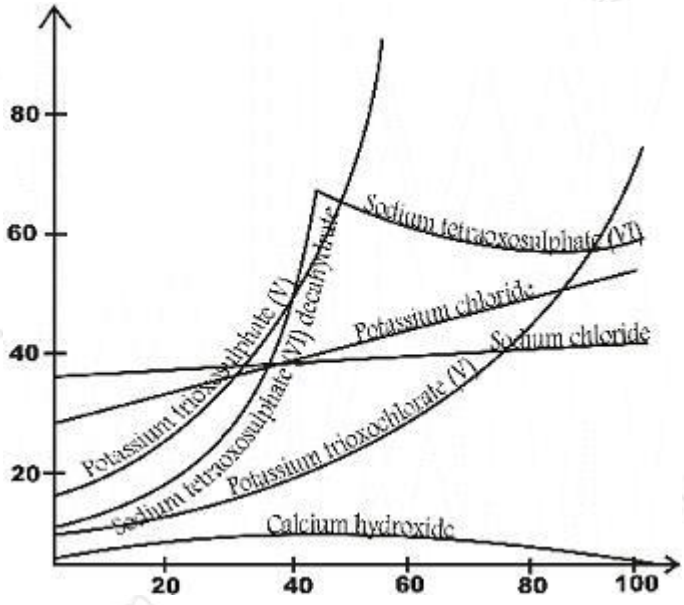
B. solutes do not scatter light rays.

C. solutes can scatter light rays.

D. none of the above.

The correct answer is option [C].

36. The diagram drawn shows solubilities of different solutes, the solubility of solute that increases with an increase in temperature is _____



A. potassium chloride.

B. sodium chloride.

C. calcium hydroxide.

D. potassium trioxonitrate [v].

The correct answer is option [D].

37. When water combines with a substance to form one product only in such a way that water molecules remain intact but bonded to the product the substance is said to be _____

A. dried.

B. hydrated.

C. dehydrated.

D. hydrolyzed.

The correct answer is option [B].

38. Which of the following are characteristics of true solution?

[i] The solutes can pass through a filter paper.

[ii] The solution can be dialyzed.

[iii] The solutes can scatter light rays.

[iv] The solutes do not scatter light rays.

A. [i], [ii], [iv].

B. [i], [ii], [iii].

C. [i], [ii], [iii], [iv]

D. [ii], [iii], [iv].

The correct answer is option [A].

39. Which of the following is not true about the hydrated and anhydrous forms of copper [ii] sulphate?

A. One is blue and the other is colourless [white].

B. One is dry and the other is wet.

C. One is crystalline and the other is powdered.

D. They have different formula masses.

The correct answer is option [B].

40. Which is the odd one out?

A. HCl.

B. NH_3.

C. NO_2.

D. CO.

The correct answer is option [B].

41. Which of the following options are properties of water except?

A. It boils at 100°C and melts at 0°C.

B. It is more dense than ice.

C. It is a non-polar universal solvent.

D. It is neutral to litmus.

The correct answer is option [C].

42. Water is temporarily hard because it contains _____

A. $CaSO_4$.

B. $MgSO_4$.

C. Chorine.

D. $Ca(HCO_3)_2$.

The correct answer is option [D].

43. Which of the following factors would not affect the solubility of a gas?

A. Concentration.

B. Nature of solvent..

C. Pressure.

D. Temperature.

The correct answer is option [A].

44. A colloidal solutions is _____

A. when a solute dissolves in a solvent and the particles of solute are smaller than the solvent particles and the particles are heterogeneous.

B. when a solute dissolves in a solvent and the particles of the solute are larger than the solvent particles and the particles are homogeneous.

C. when a solute dissolves in a solvent and the particles of the solute are smaller than the solvent particles and the particles are homogeneous.

D. when a solute dissolves in a solvent and the particles of the solute are larger than the solvent particles and the particles are heterogeneous.

The correct answer is option [B].

45. On which of the following is the solubility of a gaseous substance dependent?

a. Nature of solvent.
b. Nature of solute.
c. Temperature.
d. Pressure.

A. A, B, C and D.

B. A and B.

C. B.

D. A, B and C.

The correct answer is option [D].

Solubility is the amount of solute which dissolves in a given volume of the solvent at a particular Temperature

46. One of these is not a water pollutant.

A. Petroleum.

B. Domestic liquid and solid water.

C. Industrial effluents.

D. Biodegradable chemicals.

The correct answer is option [B].

47. When solid particles are dispersed in liquid medium it is called _____

A. sols.

B. gels.

C. aerosols.

D. emulsion.

The correct answer is option [A].

48. Which of the following methods are purification of rain water?

[i] coagulation, sedimentation.

[ii] filtration, disinfection.

[iii] boiling.

A. [i] & [ii].

B. [i] only.

C. [iii] only.

D. [ii] only.

The correct answer is option [A].

49. The following options are disadvantages of hard water except _____

A. it prevents lather of soap when washing.

B. it causes furring of kettles and boilers.

C. it has tastes because of the dissolved minerals in it.

D. it cannot be used in dyeing and tanning.

The correct answer is option [C].

50. A solution which contains more solute in solution than the maximum amount it can dissolve at that temperature is called _____

A. supersaturated solution.

B. saturated solution.

C. solubility.

D. suspension.

The correct answer is option [A].