بسم الله الرحمن الرحيم

وقل رب زدني علماً

EDUCATION WITH HAMZA

SUBJECT:
CHEMISTRY

CLASS:
9TH

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Education with Hamza

وَقُل رَّبِّ زِدْنِي عِلْمًا

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تمام تعریفیں ربِ لاشریک کے لئے جس نے مجھ ناچیز کو پیدا کیا۔ اور لاکھوں کروڑوں درود اس ذات پر جس نے ہماری بخشش کے لئے رو رو کر دعا مانگی۔ ان نوٹس کو امت محمدیہ کی آسانی کے لئے بنایا گیا ہے۔ ان کا ثواب ربِ موسیٰ و ہارون نبی آخر زماں ﷺ کی جملہ آل و اولاد اور امت کو عطا کرے آمین۔

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Chemistry

Short Question Answer

Chapter no 01: Nature of Science in chemistry

1. Define Chemistry and Difference b/w inorganic and Organic chemistry?

Ans: Chemistry is the branch of science in which we study about the nature of matter its composition, its properties, its interaction with other matter and energy.

Inorganic chemistry:-It is the branch of chemistry which deals with the study of all elements and their compound except hydrocarbons and their derivatives.

Organic Chemistry:-Organic chemistry deals with the study of hydrocarbons and their derivatives. Most of the organic compound occur naturally such as: natural gas, petroleum and rubber etc.

2. Difference b/w Analytical chemistry and Bio chemistry?

Ans: Analytical chemistry:-Analytical chemistry deal with the analysis of a sample of matter. It includes qualitative and quantitative analysis. Qualitative analysis provides information about the composition of a substance while quantitative analysis determines the amount of each component present in the substance.

Bio chemistry:-Biochemistry deals with the chemical processes taking place in the living organisms. It combines biology and chemistry to study synthesis and metabolism of biomolecules like: proteins, carbohydrates, fats etc.

3. Difference b/w polymer chemistry and Geo chemistry?

Ans: Polymer chemistry:-Polymer chemistry deals with the polymers and macromolecules. It involve the synthesis, characterizations, and properties of polymer (Large molecules) made up of monomers (simple molecule). There are thousand of polymers being used in every field of life.

Geo chemistry:-Geo chemistry deals with the study of physical aspects, chemical composition and chemical changes taking place in the earth. It include the study of the distribution of elements in minerals, rock and soil and their interaction with the earth materials.

4. Difference b/w Science, Technology and engineering?

Ans: Science-Science is the process of learning about nature through observations. It generates knowledge.

Technology-Technology is the application of scientific knowledge to create practical solutions and if possible ,add new things in it (innovation). To design and develop method for utilization of scientific knowledge is technology.

Engineering-Engineering provided the design and viable practical machines with the support of knowledge of other fields like physics and mathematics.

Q5 Define the Following?

Ans: Astrochemistry: It deals with the chemical processes taking place in the space such as stars & planets.

Nuclear Chemistry: It deals with the study of nuclear Processes taking place in the atom nuclei and radioactivity phenomenon

Medicinal chemistry: It deals with the development and Production of drugs and medicines to be used for curing of diseases

Environmental chemistry: It deals with chemical and biochemical reaction taking place in the environment

Chapter no 02~ Matter

6. Define Matter? Difference b/w microscopic and macro scope?

Ans: Matter is defined as anything that has mass and occupies space it is also called matter.

Microscopic:-The properties of matter which we can see by our naked eyes are called macroscopic properties.

Microscopic:-The properties of matter which can see through a microscope are called the microscopic properties.

7. Write three properties of solid, liquid and Gas?

Ans: Solid:-

- They have a definite shape as well as volume.
- They are rigid.
- They cannot flow.

Liquid:-

- Liquid have definite volume but they have no fixed shape.
- Liquid are non- rigid or flexible.
- Liquid are fluid. They can flow easily.

Gas:-

- Gas have neither fixed volume nor fixed shape.
- Gases can flow more rapidly that of liquids.
- Gases have very low density.

8. Define Exotic state? and liquid crystal?

Ans: Exotic state:-An exotic state is a phase of matter that exist under extreme conditions (like ultra low-tempreature) or high pressure and exhibits unusual quantum mechanical properties that defy every day physics.

Liquid Crystal:-On heating, some crystalline solids change into a cloudy liquid which is called liquid crystals.

9. Difference b/w element and Compound?

Ans: Elements:-An element is a substance made up of same type of atoms, having the same atomic number. On the basis of physical state, element exist as solid, liquid and gases. for example:- magnesium, iron, gold, silver etc.

Compound:-A compound is a pure substance that contains two or more elements combined chemically, in a fixed ratio by mass.

10. Define mixture? and writes its types?

Ans: Mixture is not a pure substance, it consist of two or more pure substance which are not chemically by combined. It is formed by fixing up of substances without any fixed ratio.

There are two types of mixture:-

- Homogenous mixture
- Heterogeneous mixture

Homogenous Mixtures:-Mixture that have uniform composition throughout the sample are called homogenous mixture. for example:- air, petrol, sugar and water solution.

Heterogeneous Mixture:-Mixture that do not have uniform composition throughout their sample are called heterogeneous mixture.

For examples: mixture of sugar and sand, oil ,rock suspension and colloid.

11. Difference b/w solution, colloid and suspension?

Ans: Solution:-All the solutions are homogenous mixtures of dissolved particles of two or more substance. for example- ink in water, solution in water etc.

Colloids:-Colloid is a kind of solution but not true solution. Therefore, they are also as colloid solution. for example- milk, ink , blood, jelly , fog and smog etc.

Suspension:-Suspension are heterogeneous mixture of un-dissolved particles spreading throughout the liquid. These particles being big enough do not dissolve and can be seen with a naked eye. for example- paint, magnesia , flour-water mixture.

12. Why does diamond not allow electricity to pass through it? Why is graphite an excellent lubricants?

Ans: Diamond does not conduct electricity because its electrons are all held tightly in place within strong covalent bond, meaning there are no free-moving electrons to carry an electrical current.

- Graphite is an excellent lubricant because of its layered structure, which allows the layers to slide past each other with very little resistance.

13. Classify compound on the basis of their properties? What is Tyndall effect what type of mixture 'shows this effect?

Ans: Compound can be classified by their bond type (ionic or covalent) or by whether they are organic or inorganic. Ionic compounds are formed by the electrostatic attraction b/w a metal and non-metal, while covalent compound are formed by the sharing of electrons between non-metals.

- The Tyndall effect is the scattering of a beam of light by particles in a medium ,making the light's path visible. This effect is shown by colloidal solutions and some very fine suspensions.

14. Define liquid crystals and their properties? also why colloid solution not show Tyndall effect?

Ans: A state of matter with properties intermediate between a conventional liquid and a solid crystal.

Properties:

- Liquid crystals can flow, deform and form droplets.
- Liquid crystals have long range molecular order
- They can change phases in response to external stimuli.
- ➢ Because the size of their solute Particles is too small (less than 1 nanometer) to scatter light.

Chapter no 03- Atomic Structure

15. Define atom and its structure?

Ans: Atom is the fundamental construction unit of all substances. All the elements are made up of atoms. All the atoms of an elements are almost identical in every respect, but they differ from atoms of all other elements. therefore, atoms of an element are unique and specific. Atoms are made up of three fundamental particles, proton, neutrons and electrons. They are also called subatomic particles.

16. Difference b/w shells and sub-shells?

Ans: Shells:-Shells or orbits are the paths where elections revolve around the nucleus. They are the main energy levels designated by the capital alphabets K, L, M, N ,etc. Shells lie around the nucleus according to their energies.

Sub- Shells:-A shells further consist of subshells or orbitals which are designated by small alphabets as s, p, d and f etc. The 'n' value guides the number of sub-shells in a shell.

17. Define nucleus and Postulates of nuclear models?

Ans: Nucleus:-Nucleus is a small positively charged part present at the centre of an atoms. It was discovered by Rutherford in 1911. After conducting a series of experiments. He proposed a nuclear model of an atom.

- Nucleus is very small as compared to the size of an atom.
- Almost the entire mass of an atom is concentrated in the nucleus ,because protons and neutrons or nucleons laid in the nucleus.
- Nucleus is positively charged as it contained protons present in it.

18. Define relative charges and relative masses of subatomic particles?

Ans: The relative charges and relative masses of subatomic particles of an atom are: The mass of a proton is almost equal to the mass of neutron. The mass of electron is very small as compared to the mass of neutron or proton. Mass of electrons is 1/1836 times less then the mass of proton or neutron. Therefore, it's considered negligible. The charge of the proton is negative, while on electrons it is negative. Neutrons has no charge.

19. Define Proton number?

Ans: Proton number or atomic number of an element is the number of protons in that atom. It is represented by a symbol "Z".

- ➢ Proton number of an element (Z) = Number of protons in one atom of the element.

- Where as, number of neutrons (N) can be calculated as following:
- Number of neutrons (N) in an atom = Atomic mass (A) - Proton number (Z).

20. Define Decay's reactions?

Ans: The thorium (Th) it self is unstable and further disintegrates to protactinium (Pa) and releasing energy.

Reactions-

$^{234}_{90}Th \rightarrow {}^{234}_{91}Pa$ + Energy

Thorium Protactinium

Beta Decay:

$^{14}_{6}C \rightarrow {}^{14}_{7}N + 1e^{-}$ + Energy

Carbon Nitrogen (β-particle)

Gamma Decay:

$^{60}_{27}Co \rightarrow {}^{60}_{28}Ni$ + Energy

Cobalt Nickel

21. Write any three uses of isotopes?

Ans. Uses of isotopes are:-

- Carbon dating:- Carbon dating is a method of age estimation of carbon containing object of fossils (like dead plants, animals or rocks.
- Medical imaging- Medical imaging is technique in which various images of body parts are taken for diagnostic or treatment. It is also called radiology. It includes X-rays radiation
- Some other uses of isotopes:-

- Radioactive isotopes are used to detect faults in the underground electric cables.
- Radioactive isotopes are used to detect the leakage in underground waterpipes, gas pipe, lines and oil pipelines.
- Radioactive isotopes are used for the preservation of food stuffs such as onion, fruits, fish for longer period of time.

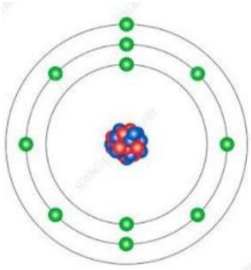
22. Describe the formations of cation and Anions?-

Ans. Ion is an atom or group of atoms having either a positive or a negative charge. There are two types of ions Cation and anion.An atom or group of atoms having a positive charge on it is called Cation.

-Example: Na → Na+ + 1e

Sodium atom Sodium ions

Sodium atom consist of 11 electron



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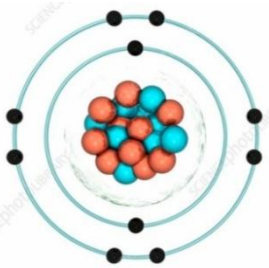

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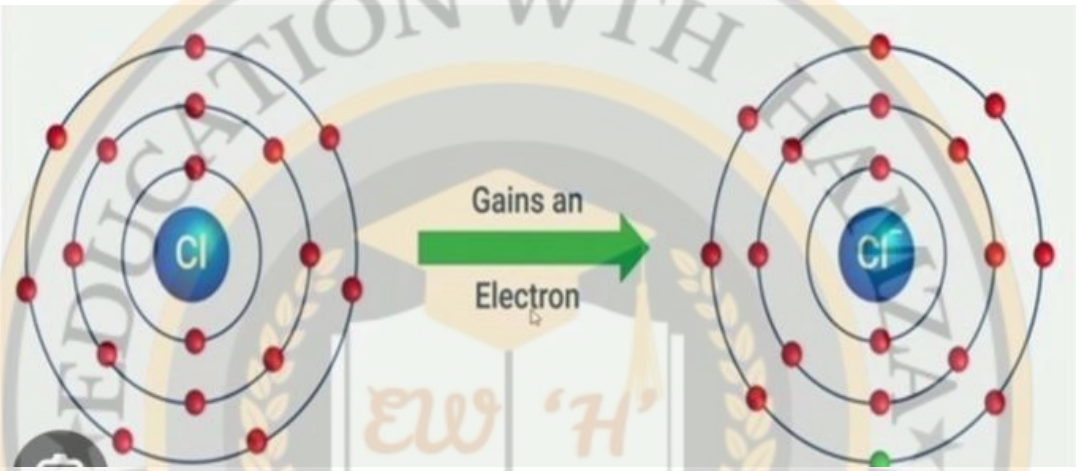
Neon atom consist of 10 electron

An atom or group of atoms having a negative charge on its is called anion. The atoms having 5,6, or 7 electrons in their valence shell cannot lose their valence electrons become energy required to remove an electron is too much high.



Chloride atoms consist of 17 electrons (2,8,7)

(Gain one electrons)

(chloride ions consist of 18 electrons.) (2,8,8)

23. Define relative atomic mass and write its formula?

Ans. To measure the mass of an atom is practically impossible because it is very small entity. The atomic mass of an element is the relative mass of its atom as compared with mass of C-12 atom taken as 12 units.

Formula=

$$\text{Relative atomic mass} = \frac{(\text{Atomic mass x relative abundance}) + (\text{atomic mass x relative abundance}).}{100}$$

24. Why an atom is called electrically neutral? Why some isotopes exhibit radioactivity?

Ans. An atom is electrically neutral because it has an equal number of positively charged protons and negatively charged electrons. Some isotopes are radioactive because their nuclei are unstable due to an imbalance of protons and neutrons.

Chapter no 4 - Chemical Bonding

25. Different b/w Duplet and Octet Rule?

Ans. Duplet:-The duplet rule is the chemical principle that light elements like hydrogen and helium are stable when their outermost electron shell contain two electrons.

Octet:-The octet rule is a chemical principle stating that atoms tend to gain, lose, or share electrons to achieve a stable configuration with eight valence electrons.

26. Define Metallic bond and write its properties?

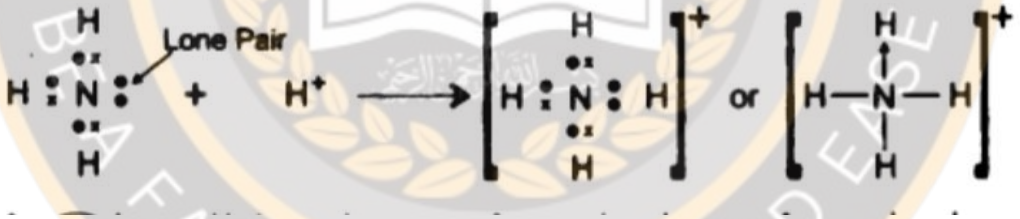
Ans. The metals have rigid structure in which their atoms do not leave their properties and position. However, a sea or cloud of the delocalized valence shell electrons which are loosely bonded is available in them. Metallic bond is the force that hold atoms together in metal. It help in passing of electric current through the metals.

Properties of Metals:-

- Metals contain metal ions and sea of free electron. Therefore, metals are good conductor of electricity.
- Metals have high melting and boiling point.
- They show metallic lusters.

27. Define coordinate covalent bond?

Ans. Coordinate covalent bond is a type of covalent bond in which the bond pair of electrons is donated by one of the bonded atoms only. One atoms is donor and other atom is acceptor of electrons. This type of bond is represented by a small arrow, pointing from donor to acceptor atom. The non-bonded electron pair is called lone pair. for example- bond formation between a proton (H+) and ammonia (NH3) molecule.



Formation of NH4+ (ammonium) ion.

28. Difference b/w ionic compound and covalent compound?

Ans. Ionic Compound:-

- Ionic compounds are usually crystalline solids.
- They have high melting and boiling points.
- They are soluble in water but insoluble in organic solvents.

Covalent Compounds:-

- Covalent compound are mostly gases and liquids a few are solid like iodine.
- They usually have low melting and boiling point.
- They are insoluble in water but soluble in organic solvents.

29. How metallic bond is formed b/w metals atom? Justify that ionic compound have high melting and boiling points than that of covalent compounds?

Ans. Metallic bond form through the electrostatic attraction between a lattice of positive metal ions and a "sea" of delocalized mobile electrons.

- Ionic compound have higher melting and boiling points that covalent compounds because the strong, electrostatic forces b/w the oppositely charged ions in their crystal lattice require a lot of energy to break.

30. Why diamond has very high melting point? Why graphite conducts electricity?

Ans. Diamond has a very high melting point because its carbon atoms are arranged in a strong, three - dimensional network of covalent bonds requiring a large amount of energy to break these strong bonds.

- Graphite conducts electricity because each carbon atom is bonded to only three other carbon atoms leaving one electrons but atom free to move.

Chapter no 05 - Stoichiometry

31. Define molecules and its types?

Ans. Molecules of an element that contain one or two or more same kind of atoms are homoatomic molecules. for example:- hydrogen (H_2), sulphur (S_8), ozone (O_3) etc.

Types of Molecules:-

Monoatomic Molecules:-Noble gases exist as a single atom. These are called monoatomic molecules. for example :- Helium, Neon, Argon etc.

Diatomic Molecules:-When the molecules consist of two similar or different types of atoms they are called diatomic molecules. for example:- H_2, O_2, Br_2, HCl gas etc.

Triatomic Molecules:-When the molecules consist of three similar or different types of atoms they are called triatomic molecules. For examples:- O_3, CO_2, H_2O etc.

Polyatomic Molecules:-When the molecules consist of four or more similar or different types of atoms they are called poly atomic molecules. for example:- Sulphuric acid, Nitric acid etc.

32. Difference b/w molecular and empirical formula?

Ans. Molecular formulas: The symbolic representation of chemical compound or molecular element is called molecular formula.

For example:- a molecule of carbon dioxide gas consist of one atom of carbon and two atoms of oxygen.

Empirical formulas:- Empirical formula is the simplest whole number ratio of different atoms or ions forming a compound.

For example: molecular formula of glucose is $C_6H_{12}O_6$.

33. Difference b/w chemical formula and symbol of element?

Ans. A chemical symbol represents a single chemical element, while a chemical formula represents a compound and shows the ratio of different elements that make up that compound.

34. Difference b/w mole and Avogadro's numbers?

Ans. **Mole:-**A mole is a unit of measurement for the amount of the substance in chemistry, Similarly how a "dozen" is a unit for counting objects.

Avogadro's Number:-Avogadro's number is a specific constant value (6.022x 10^23) that tells you how many particles (like atom or molecule) are in one mole of any substance.

Therefore, one mole of any substance contains exactly Avogadro's number of particles.

35. Relationship between mass of a substance mole and Avogadro's number?

Ans. The mass of a substance has a relationship with its numbers of moles and number of particles. This relationship is based upon mole concept. To calculate number of moles and number of particles from known mass of a substance the following relationship used.

i) Number of moles (n) = known mass of a substance (m)/Molar mass of a substance (M)

OR n = m/M

Numbers of particles = n x NA

ii) Numbers of particles = number of moles x 6.02 x 10^23

36. Calculate no. of moles from the given mass?

Ans. 37. 15g of carbon dioxide

Solve:

= Atomic mass of carbon ≈ 12.01 g/mol

= Atomic mass of oxygen ≈ 16.00 g/mol

= Mco2 = (1x12.01g/mol) + (2x16.00g/mol)

n = m/M

Given mass (m) = 15g

Molar mass (M) = 44.01 g/mol

n= 15g / 44.01 g/mol

= 0.341 moles.

37. Calculate mass from given moles of?

i. 10 moles of sulphuric acid

Solve:

The chemical formula of sulphuric acid is $H_2\ SO_4$

The molar mass of Hydrogen is approximately 1.01g /mol

The molar mass of sulphur is approximately = 32.07 g/mol

The molar mass of oxygen is approximately = 16.00g/mol

The calculation of the molar mass of $H_2\ SO_4$ is:-

Molar Mass = (2 x 1.01g/mol) + (1x 32.07)g/mol

Molar Mass = 2.02g/mol + 32.07 g/mol+ 64.00g

Molar mass = 98.09 g/mol ans.

38. Calculate number of moles from the given numbers of Particles?

i) 3.02× 10^{23}atoms of carbon

Solver

Number of moles = Number of particles (N)

Avogadro Number (N_a)

= 3.02 × 10^{23} atom

= 6.022×10^{23} atom /mol

m= 3.02 X 10^{23} atom

6.022 × 10^{23} atom/mol

m=~ 0.5015 moles.

2. 9.03×10^{23} molecules of Nitrogen gas-

Solve:-

Avogadro's number (NA): 6.022 × 10^{23} molecules/mol

Moles= (Number of molecules) / (NA)

Moles of N_2 = 9.03×10^{23}molecule/ 6.022 × 10^{23} molecules/mol = 1.5

= 2×14.01 g/mol = 28.2 g/mol

Mass= moles x molar mass

Mass= 1.5 mol x 28.02 g/mol

= 42.03g ans-

3. 12.04 × 10^{23} formula unit of sodium chloride-

Solve:-

Use Avogadro's number, which states that one mole of a substance contain = 6.022×10^{23}

Moles= 12.04×10^{23} formula unit / 6.022×10^{23} formula unit/mol

≈ 2.00mol

= Atomic mass of Na ≈ 22.99 g /mol

= Atomic mass of Cl ≈ 35.45 g/mol

= Molar mass of NaCl = 22.99g/mol + 35.45 g/mol

= 58.44 g/mol

= Mass = moles × Molar mass

= Mass = 2.00mol x 58.44 g/mol

= 116.88g ans-

39. Calculate number moles and number of particles?

i) 80g of water

MH_2O = 2 x MH + Mo

MH_2O = 2(1.008g/mol) + 15.999 g/mol

MH_2O = 18.015g/mol

n = m/M

n = $\frac{80\ g}{18.015}$ g/mol

n = 4.44 mol

N = n x NA

N = (4.44 mol) x (6.022×10^{23}) particles/mol

N = 2.67×10^{24} molecules.

2. 60g of chlorine gas:-

Solve:-

Molar mass of chlorine gas (Cl_2).

The atomic mass of one chlorine atom is approximately

= 35.45 g/mol

= (2) x 35.45 g/mol = 70.9 g/mol

n = m/M

n = $\frac{60\ g}{70.9}$ g/mol

= ~ 0.846 mol ans:-

3. 50g of sodium carbonate:-

Solve:-

= Sodium (Na): 22.99 g/mol

= Carbon (C): 12.01g/mol

= Oxygen (O): 16.00 g/mol

= M= (2x22.99)+(1x12.01)+(3x16.00)=105

m = m/M

m =$\frac{50\ g}{105.99}$ g/mol

= 0.4717 mol

(NA= 6.022 x 10^23)

N= n x NA

N= 0.4717 mol x (6.022 x 10^23) particles/mole

= 2 ans.

The number of mole in 50g of sodium carbonate is approximately 0.4717 mol, and the number of particle is approximately = 2.8416 x 10^23 particles.

Chapter no 06: Electrochemistry

40. Define electrochemistry? Difference b/w oxidation and reduction?

Ans. Electrochemistry is the branch of chemistry that deals with the chemical action of electricity and the production of electricity by chemical reaction.

Oxidation:-In a chemical reaction, loss of electrons from a substance is called oxidation. Oxidation is loss of electrons by an atom or an ion. for example:

Zn --> Zn^+2 + 2e^- .

Reduction:-Reduction is a chemical process where a substance gains electrons resulting in a decrease in oxidation state.

41. Define redox Reaction?

Ans. Redox reaction are those chemical reaction in which oxidation and reduction processes take place simultaneously and side by side.

42. Difference b/w oxidizing and reducing agent?

Ans. Oxidizing agents-An oxidizing agent is defined as a substance that oxidizes another substances in a chemical reaction. Such substances itself is reduced. In terms of electrons it accepts electrons from the other substance.

Reducing agents-Reducing agent is defined as a substance that reduces another substances by providing electrons to the other substance. That substance itself is oxidized as it loses elections.

43. Define oxidation state? What is the oxidation state of hydrogen, sulphur and oxygen in $H_2\ SO_4$?

Ans. An oxidation state or oxidation number is the hypothetical charge an atom would have if all of its bonds to the other atoms were 100% ionic. It is a measure of the degree of Oxidation (loss of electrons) or reduction (gain of electrons) of an atom within a chemical compound.

44. Define corrosion and explain how its take place? Why can the corrosion not be controlled once its starts?

Ans. Corrosion is a natural process that convert a refined metal into a more chemically stable oxide. It is the gradual deterioration of materials (usually a metal) by chemical or electrochemical reaction with their environment.

Corrosion cannot always be completely stopped because it is a natural, spontaneous process and can continue if protective layers are breached. Once started corrosion can be difficult to control if the protective layers is damaged , allowing the underlying metal to continue reacting with the environment.

45. Define galvanizing and give one example? What is electroplating and Give an example?

Ans. Galvanizing (also spelled galvanization) is the process of applying a protective zinc coating to steel or iron , to prevent rusting.

Electroplating is the process of using an electric current to coat a thin layers of one metal into another object , primarily for decorative purposes or to prevent corrosion. An example is galvanization where a layer of zinc is electroplated into iron or steel to protect in from rusting.

46. Calculate the oxidation state of the marked elements of the following compound?

1. Pb(NO3)2

Solve:-

= Pb(NO3)2

= (Pb^{x+})(NO3-)

= (NO3)=-1

= 2x(-1)=-2

= Pb(NO3)2

= +2 oxidation state of n

= +2(-1)=0

= -2=0

= +2

= Pb is +2.

= 3x(-2)=-6

= (Oxidation state of N)+3(Oxidation state of O)

= x+3(-2)=1

= x-6=-1

= x=+5

- There fore, the oxidation state of N is +5.

- Based on the standard rule, the oxidation state of O is -2.

2. Hg2Cl2

Solve:-

In Hg2Cl2, the oxidation state of each mercury (Hg) atom is +1 and the oxidation state of each (Cl) atom is -1.

3. MgO

Solve:-

In MgO, magnesium has an oxidation state of +2 and oxygen has an oxidation state of -2.

(O.S.of Mg) + (O.S.of O) = 0

= x + (-2) = 0

= x - 2 = 0

= x = +2 ans.

4. NH3

Solve:-

(O.S.of N)+3(O.S.of H)=0

= x+3(+1) = 0

= x+3 = 0

= x = -3 ans.

5. MgSO4

Solve:-

(O.S.of Mg)+(O.S.of S)+4(O.S.of O)=0

= +2 + x + 4(-2) = 0

= x - 6 = 0

= x = +6 ans.

6. CO2

Solve:

(O.S.of C)+2(O.S.of O)=0

= x + 2(-2) = 0

= x - 4 = 0

= x = +4 ans

Chapter no 07:- Energetics

47. Difference b/w Exothermic and Endothermic reaction?

Ans. Exothermic Reactions

- Heat is given out (evolved).
- Heat flows from a system to the surrounding.
- Temperature of the system drops while that of surrounding rises up.
- Enthalpy 'H' of products is less than that of reactant.
- Enthalpy change of the reaction ΔH, is negative.

Endothermic Reactions

- Heat is taken in (absorbed).
- Heat is absorbed by the system from the surroundings.
- Temperature of the system rises up while that of surrounding drops.
- Enthalpy 'H' of products in greater than that of reactant.
- Enthalpy changes of the reaction ΔH is positive.

48. Difference b/w system and surrounding?

Ans. System: System is defined as anything under study or observation.

Surrounding: Surrounding is everything around the system.

For example:- when we are studying a chemical reaction, the chemicals are system.

49. What do you mean by enthalpy change of a reaction Explain with reference to bond breaking and bond formation?

Ans. Enthalpy change of a reaction is the net heat absorbed or released during a chemical reaction and it can be understood by considering the energy required to break bonds versus the energy released when new bonds are formed. Bond breaking in the reactant requires energy(an endothermic process), while bond formation in the products releases energy(an exothermic process).

$\Delta H_{rxn} = \Sigma(\text{Bonds Broken}) - \Sigma(\text{Bonds formed})$.

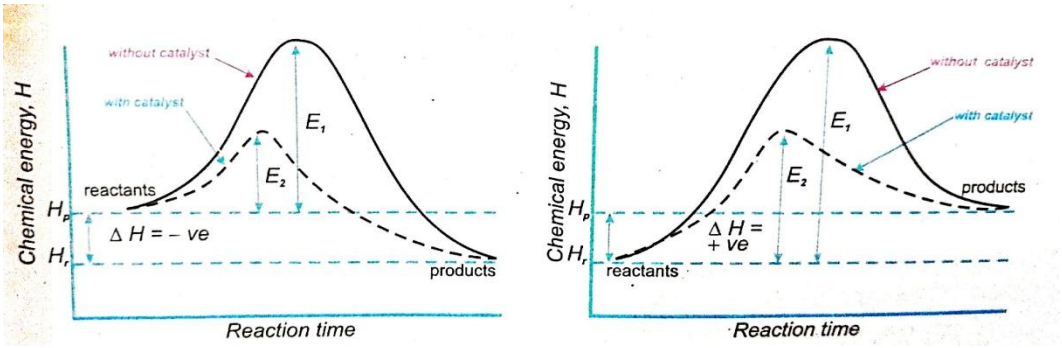
50. Difference b/w aerobic and anaerobic respiration?

Ans. Aerobic Respiration:-Aerobic respiration uses oxygen to break down glucose , producing a large amount of energy (ATP) , carbon dioxide and water.

Anaerobic Respiration:- In contrast, anaerobic respiration occurs without oxygen, yielding a small amount of energy, and its by products are typically lactic acid or ethanol and carbon dioxide.

51. Define Activation Energy? Also Draw a labeled diagram for a catalyzed exothermic reaction & endothermic reaction.

Ans. The minimum amount of energy that the reacting particles must have for a reaction to take place. It is represent by Ea



Chapter no 08:- Equilibrium

51. Difference b/w reversible and Irreversible reaction?

Ans. Reversible reactions: In a chemical reactions the reactant combine to form new substances that are called products. In most of the reactions, the product don't recombine to form reactant back they are called reversible reactions. for example:-

$AgNO_3 + NaCl \longrightarrow AgCl + NaNO_3$.

Irreversible reaction:- Those reactions in which products recombine to produce the reactants back are called irreversible reaction. In such reaction, when reactant form products it is called forward reaction. for example-

$CO_2 + H_2O \longrightarrow H_2CO_3$.

52. Give the characteristics of a reversible reaction? Why reversible reactions do not complete?

Ans. A reversible reaction can proceed in both forward and reverse directions, reaching a state of dynamic equilibrium where the rates of both reactions are equal and reactant and product concentrations remain constant.

- Reversible reactions never complete because they reach a state of dynamic equilibrium ,where the forward reaction (reactant to product) and the reverse reaction (product to reactant) occur at the same rate.

53. Define equilibrium state and give it condition? Explain with an example effect of heat on a hydrated compound?

Ans. An equilibrium state is a condition in which a system is balanced with no net change occurring over time.

During healing, hydrated salt loses its water of crystallization by absorbing a certain amount of energy, called the enthalpy of dehydration. (ΔH dehyd).

54. How equilibrium is achieved in a closed system? Why does not equilibrium establish in open system even for reversible reactions?

Ans. In a closed system equilibrium is achieved when the rate of the forward reaction equals the rate of the reverse reaction.

Equilibrium cannot be established in an open system because matter can escape, preventing the reverse reaction from occurring at the same rate as the forward reaction.

55. Define hydrated compound and give an example? Why does not equilibrium establish in irreversible reaction?

Ans. A hydrated compound is a substance that has water molecule trapped within its crystal structure. These water molecule are called the "water of crystallization" or water of the hydration. Two examples are copper (II) sulfate pentahydrate ($CuSO_4 . 5H_2 O$) and magnesium sulfate heptahydrate (Epsom salt) $MgSO_4 . 7H_2 O$.

An irreversible reaction does not establish equilibrium because it proceeds in only one direction. Reactant are completely converted two product and the reverse direction doesnot occur. Equilibrium requires a reversible reaction where the forward and reverse reaction rates are equal a conditions that is impossible is a reaction that only goes in one direction.

56. Difference b/w open and close system?

Ans. An open system can exchange both energy and matter with its surroundings with a closed system can only exchange energy not matter. Open system are more dynamic because they interact with their environment, whereas closed system are more isolated from environmental changes.

Chapter no 09:- Acid and Bases

57. Difference b/w Acid, bases and salts?

Ans. Acid and Bases-An acid is a proton donor substance and base is a proton acceptor substance. for example- When HCl dissolve in water. HCl donates it's proton to water. Therefore, HCl acts as an acid and water as a base.

$HCl + H2O \rightarrow H3O+ + Cl-$

Salt- When acids react with base the product formed as a result of acid and base reactions is salt. for example:-

HCL, NaCl, NaOH etc.

58. Define strong and weak bases?

Ans. A base that ionizes completely in aqueous solution is called strong base. A base that ionizes partially in aqueous solution is called weak base. for example: NaOH, KOH, $Ca(OH)_2$ etc.

Difference b/w strong and weak acids Strong acids ionize completely in aqueous solution. These are easily dissolved in water. Its pH is less than 3

Weak acids only partially dissociate. It has pH btw 5 and 7

59. Define acid rain and its harmful effects?

Ans. Acid rain- Acid rain is rain water which has been made acidic by certain pollutants present in the atmosphere.

Harmful effects of acid rain:-

- Eroding stonework and rocks especially near coast, endangering the life there.

- Causing damage to the leaves and plants life, resulting deforestation.
- Causing corrosion to steel structures like bridges, and other steel infrastructure.
- Eroding buildings, monuments of stone and metals by reacting with them like an acid.

60. Define Bronsted lowry acid and bases with examples? Give the disassociation equations of strong and weak acids is aqueous solutions?

Ans. Bronsted lowry acids include HCl and H2O(in the reaction with ammonia) while examples of Bronsted - lowry bases include NH3 and H2O (in the reaction with HCl). A Bronsted lowry acid is a proton(H+) donor, and a base is proton acceptor. Water can act as both an acid and a base making it an amphoteric substance.

A strong acids dissociation equation in aqueous solution used a single arrow to show complete ionization, while a weak force adds uses a double arrow to indicate an equilibrium with partial ionization. for example- HCl → H+ + Cl-.

61. Difference b/w alkalis and bases with examples? Give the reactions of bases with example metal and carbonate?

Ans. The main difference is that alkalis are water - soluble bases, while bases can be either soluble or insoluble in water. All alkalis are bases, but not all bases are alkalis. for example- Sodium hydroxide (NaOH) is a alkali because it dissolves in water while as copper oxide (CuO) is a base that is not an alkali because it is insoluble in water.

A base react with an acid to produce a salt and water (neutralization reaction) while a base reacts with ammonium salt to Produce a new salt, water and ammonium salt gas (NH3). The reaction between a base and an ammonium salt is a common method for preparing ammonia gas in the lab, and its release can be confirmed by the pungent odor or by testing if moist red, litmus paper turns blue.

Chapter no 10:- Periodic Table

62. Define Periodic Table?

Ans. The elements were arranged according to increasing atomic number horizontally from left to right such that it created a table are called periodic table.

63. Difference b/w Periods and Groups?

Ans. Periods:-The horizontal rows in periodic table are recalled the periods. The periodic table consist of seven periods of element numbered from 1 to 7.

Groups:-The verticals column in the periodic table are called groups. These are 18 groups in the long modem form of the periodic table.

64. Difference b/w lanthanides and Actinides?

Ans. Lanthanides- It is a group of rare Earth elements starting after Lanthanum (La, atomic number 57) up to Lutetium (Lu atomic number 71) in the 6th period. They show the extraordinary resemblance in their properties.

Actinides- It is a group of elements placed in 7th period. It starts after actinium (atomic number 89) up to lawrencium (having atomic number 103). This group still incomplete a newly discovered elements are placed in it.

65. Define atomic radious?

Ans. Atomic radius of an atom is the half of the distance between the nuclei of the two bounded atom, are called atomic radious.

66. Difference b/w electron affinity and electronegativity?

Ans. Electrons affinity: It is the amount of energy released by an atom when an electrons add in the outermost shells of an isolated gaseous atom.

M + e- —> M- + electron affinity energy

Electronegativity: The electronegativity is defined a characteristics property of an atom to attrab the shared pair of electrons toward itself in a molecule.

67. Why does size of atoms decreases regularly in a period? What is trend of size of atom in a group?

Ans. The size of atoms decreases regularly across a period because as the number of proton in the nucleus increases, it creates a stronger positive charge that pulls the electrons closer.

The size of an atom increases as you move down a group in the periodic table because each new period adds a new electrons shells which increases the distance b/w the nucleus and the outermost electrons.

68. Why is the electronegativity of fluorine highest in its group? What is metallic character? Why it increases in a group and decreases in a period?

Ans. Yes, flourine has the highest electronegativity of its group (halogens) because it is the topmost element in that group. Its small atomic size and high effective nuclear charge mean that its nucleus has a strong pull on bonding electrons, a pull that is even stronger than in the larger atoms below in the group which have more inner electrons shells that sheild the nucleus.

- Metallic character is an element's tendency to lose the electrons to form a positive ion (cation). It increases down a group because the atomic number and size increases, placing valence electrons farther from the nucleus and making them easier to lose. It decreases across a period from left to right because the atomic radius decreases due to stronger nuclear charge pulling the electrons closer making them harder to remove.

70. Why potassium is more metallic than that of sodium? Why sodium is more metallic than that of magnesium?

Ans. Potassium is more metallic than sodium because its larger atomic size means its valence electron is farther from the nucleus and shielded by more inner electrons making it easier for potassium to lose that electrons.

- Sodium is more metallic than magnesium because it has a lower first ionization energy and a greater tendency to lose a single valence electron to achieve a stable noble gas configuration.

71. What is chemical reactivity?

Ans. Chemical reactivity is a substance ability to undergo a chemical reaction with other substance.

72. Do all alkali metals have the same chemical reactivity?

Ans. No, alkali metals don't have the same chemical reactivity increases as you move down the periodic table group. This is because as the atomic size increases, the outermost electrons is farther from the nucleus, making it easier to lose and increasing reactivity. While they share a similar characteristics of being highly reactive, Lithium is the least reactive alkali metal, and francium is the most reactive.

Chapter no 11-Groups Properties and elements

73. Define prediction of properties of other element in group1?

Ans. From the given information as detailed previously other elements will be.

- More reactive metals having more metallic characters.
- The melting point of other members of the group1 will be lower than that of first member.
- Other properties of group 1, like softness and density can be predicted. If potassium metal has density 0.86g/cm3, then next member must be denser than that of potassium.
- All alkali metals are reactive metals.

74. Define prediction of properties of other element in group 17?

Ans. As described earlier the elements of group 17 are also known as the halogens. They have general electronic configuration "np5", it contains five electrons in the 'p' sub - shells. The basic information from electronic configuration and properties Such as:

- Density of halogens increase in the group.
- Melting and boiling point of halogens increases down the group.
- Atomic size of halogens increases down the group.
- Colour of the halogens become darker down the group.
- Reactivity of the halogens decreases down the group.

75. Define catalyst?

Ans. Transition elements as well as their compounds act as catalyst in chemical reaction and are applied in various industrial processes.

76. Difference b/w Haber process and Contact process?

Ans. Haber process:- This process is used for ammonia production on industrial scale. Iron act as catalyst in this process.

Contact process:- This process is used for the synthesis of Sulphuric acid. Platinum is used as catalyst.

77. Which group of elements usually forms coloured compounds? Which set of metals in the periodic table are more reactive?

Ans. Transition metals are the group of elements that usually form coloured compounds because their ions have partially fixed d orbitals, when visible lights interacts with these compounds electrons can absorb specific wave length of light to jump between the split energy levels of the d orbitals and the remaining transmitted colors create the observed compound color.

- The most reactive set of metals in the periodic table are the alkali metals, which are found in the group 1. This group includes elements like lithium (Li) sodium (Na) potassium (K), Rubidium (Rb), Cesium (Cs). Their heigh reactivity is because they each have one electron in their outer most shell that they can easily lose to form a stable ion.

78 .Why are element of group - 18 non- reactive?

Ans. Elements in group- 18 the noble gases, are non-reactive because they have a full and stable outer electron shell, meaning they don't need to gain, lose or share electrons.to become stable.

79. What is trend of melting and boiling for alkali metals? Why density increases downward in alkali metals?

Ans. The melting and boiling points of alkali metals generally decrease as you move down the group for lithium to francium.

- The density of alkali metals increases downward in the group because the increase in atomic mass is greater than the increase in atomic volume (or atomic radius) as you go down the group.

80. Mention the states and colours of halogens? What is a displacement reactions?

Ans. At room temperature, halogens are found in all three states of matter. Flourine and chlorine are pale yellow and pale green gases, respectively. Bromine is a reddish - brown liquid and lodine , astatine are solids , with lodine being a violet -black crystalline solid and astatine a black solid.

- A displacement reaction is a chemical reaction where a more reactive element replaces a less reactive element in a compound.

81. Why density of iodine is more then that of bromine? why flourine is more reactive then halogens?

Ans. Because it is located lower in the periodic table's halogen group

- Because it has a low bond dissociation energy for the F-F bond, making it easy to break and it is the most electronegative element

Chapter no 12-Atmosphere

82. Write four effect of acid rain?

Ans. Effect of acid rain- Acid rain has negative effects on buildings , trees and plants, aquatic life ,bridges etc.

Acid rain damages the building and monuments made up of marble and limestone. The acid reacts with metals and carbonates present in the marble and limestone. Acid rain effect aquatic life. Acid rain on soil and rocks

- Leaches heavy metals with it and discharge these metals into the natural water bodies.
- Acid rain leaches important nutrients from the soil without these nutrients, plant growth is retarded. On the other side acid rain increases the unnecessary chemicals in the soil, which are toxic for plants.
- Acid rain increases the corrosion of steel structures and bridge made of metals. Due to this steel structures and bridges are being damaged day by day.

83. How does deforestation can be controlled? Define desulphurization, how it takes place?

Ans. Deforestation can be controlled through a combination of government policies, sustainable industrial practices and individuals consumers choices.

- Desulfurization is the process of removing sulfur or sulfur-containing compounds from fuels, gases or industrial products to reduce pollution and prevent equipment corrosion. It is commonly applied in petroleum refining, natural gas processing, flue gas treatment.

84. Name the major components of air? Name the major pollutants of air?

Ans. The major components of air are:

- Nitrogen
- Argon
- other gases(trace amount)
- Oxygen
- Carbon dioxide
- krypton, water vapour.

The major pollutants of air are:

- Carbon monoxide
- Sulphur oxide
- Nitrogen oxide
- Hydro carbons
- Particulate matter
- Lead (Pb)
- Ozone
- Volatile organic compounds

85. Why do burning of fossil fuels contaminate our air? What pollutants are given out on burning of fossil fuel?

Ans. In short burning fossil fuels releases pollutants that damage the air, harm living organism and disrupt the earth's climate balance.

- Burning fossil fuels releases pollutants including green house gases like: Carbon dioxide and nitrous oxide as well as toxic gases such as sulfur dioxide, carbon monoxide and particulate matter.

86. How global warming is affecting climate on earth? What are the sources of carbon dioxide and how it causes air pollutants?

Ans. Global warming is affecting earth's climate by causing more frequent and intense extreme weather events like heat waves, droughts, and floods as well as rising sea levels due to melting ice and thermal expansion of oceans.

- Sources of carbon dioxide include human activities like burning fossil fuels for energy and transportation, deforestation, and industrial processes and natural processes such as, volcanic eruptions respiration and decomposition.

87. What is photochemical smog? How sulphur can be removed from fossil fuels?

Ans. Photochemical smog is a type of air pollutants formed when sunlight, nitrogen oxide and volatile organic compounds (VOCs) react in the atmosphere.

- Sulphur is removed from fossil fuels through chemical processes like hydro desulfurization, which uses hydrogen and a catalyst to convert sulfur compounds into hydrogen sulphide gas.

Chapter no 13:- Water

88. Write any three harmful substances in water?

Ans. Toxic metal Compounds:- The naturally occuring water contains many pollutants ,due to which it turns to be waste water. It may be due to addition of effluents from factories, house, hold waste or from fields water. These pollutants contains toxic metal compound of arsenic, lead, mercury etc.

Plastics:-One of most dangerous pollutants present in water is plastics. We throw many kinds of plastics in water bodies. The presence of these plastics causes the unhygienic environment.

Nitrates and phosphates:-Nitrates and phosphate enterin the water because of fertilizers. High concentration of these compounds is harmful for all kinds of life.

89. How harmful microbes in water causes water borne diseases? How sewage causes water pollutions?

Ans. Harmful microbes like: bacteria, viruses, and parasites cause water borne diseases by being transmitted through contaminated water, primarily when people ingest it.

- Sewage pollutes water by introducing nutrients, pathogens, organic matter and toxins, which can lead to oxygen depletion through a process called eutrophication creating dead zone for aquatic life.

90. Why is sedimentation and filtration carried out in the water treatment process? Why is water passed over activated carbon in the water treatment process?

Ans. Sedimentation and filtration are essential steps in the water treatment process because they remove different sizes of suspended solid and contamers, which improves the effectiveness and reduces the cost of further purification.

- Water is passed over activated carbon in the water treatment process, primarily to remove organic chemicals, chlorine, and contaminants that cause unpleasant tastes, colours and odors.

91. How water is identified by using anhydrous copper sulphate? Differentiate b/w tap water and distilled water?

Ans. Water is identified using anhydrous copper sulphate by observing a distinct colour change from white to blue.

- Tap water comes from local sources like rivers or lakes and is treated to remove contaminants, but still contains minerals.
- Distilled water is created by boiling water and condensing the steam, which removes both impurities and minerals, resulting in a purer, flavorless liquid.

92. Give the characteristics of rain water? What are negative effects of pollutants in water?

Ans. Rain water is a soft, naturally distilled form of precipitation, but its purity and chemical characteristics change as it falls through the atmosphere and collects contaminants. The final composition of rainwater is highly variable and depend on local environmental factors.

- Water pollution has negative effects on human health causing diseases like cholera and typhoid, and can lead to long-term issues like cancer, liver damage, and develop-mental problems.

93. Define fertilizers and point out three nitrogen providing fertilizers? What are common reasons of diarrhea and what it causes?

Ans. A fertilizer is any natural or synthetic substance containing nutrients that is added to soil or plant tissues to enhance plant growth and productivity.

- Common causes of diarrhea include infections from viruses, bacteria, and parasites, food intolerances or allergies, and reactions to certain medications.

94. Briefly explain dysentery?

Ans. Dysentery is an intestinal infection that causes severe diarrhea with blood or mucus, often accompanied by fever, cramps, and vomiting.

95. Define water scarcity?

Ans. Pakistan is water insufficient country water scarcity means a situation in which sufficient water is not avaible to meet the demands of water. ie: less water is available than required. There are many reason of it, a few are mentioned here.

- Rapid population growth
- Climatic changes
- Water pollution
- Inefficient infrastructure
- Water mismanagement.

96. Define fertilizers and NPK fertilizers?

Fertilizers are substances that provide essential elements for plant growth. The synthetic fertilizers are urea, ammonium nitrate. The solubility of fertilizers is very important because on dissolving in water, they provide essential nutrients to the plants.

- NPK stands for nitrogen, phosphorous and potassium element respectively. This term is used for synthetic fertilizers providing these three essentials to the plants. Usually, the ratio of these elements is 5:3:5 in the pack, but this may vary.

Chapter no 14:- Basic Organic Chemistry

97. Define Organic compound? Differentiate b/w open and close chain compounds?

Ans. Organic compounds are hydrocarbons and their derivates, containing other elements like oxygen, nitrogen, sulphur, halogens and even some metals.

Open and close chain compounds:-

- The organic compounds that don't have cyclic or carbon chain ring formation in their molecules is called open chain.
- The organic compounds that contains ring in their molecules, are called close chain.

98. Difference b/w straight chain compound and branched chain compounds?

Ans. Straight chain compounds:- In these compounds, carbon atoms are linked with each other to form a straight chain.

Example:-

H_3 C -CH_2 -CH_2 -CH_3 (n- Butane)

H_3 C -CH_2 -CH_2 -CH_2 -CH_3 . (n- Pentane)

Branched chain compounds:- These compounds contain a branch chain of carbon atom. Example:- CH_3 - CH - CH_2 -CH_3

|

CH_3

99. Difference b/w homocyclic compound and Heterocyclic compounds?

Ans. Homocyclic Compounds:-are made up of only carbons atoms forming a ring. They are further divided into: aromatic compound and alicyclic compound.

Heterocyclic Compounds:-These compounds contain one or more atoms like:- oxygen, sulphur or nitrogen other than carbon atoms in their rings: example: Pyridine (C5H5N).

100. Difference b/w structural formula and structural isomers?

Ans. Structural formula:-The structural formula represents the exact arrangement of all the atoms of various elements presents in the molecule of organic compound.

Structural isomers:-The organic compounds which have same molecules formula but have different structural formula are called as structural isomers.

101. Define homologous series ?

Ans. A group of compounds having difference of only -CH2- atoms in their successive members,and showing similar properties is known as a homologous series.

102. Difference b/w saturated and un- saturated organic compounds?

Ans. Saturated Organic Compounds:-The compound in which each carbon atom is bonded with four other atoms through a single bond are called saturated organic compounds.

Un- saturated organic Compounds:-Organic compounds which have double or triple bonds between the carbon atoms are called un- saturated organic compounds.

103. Define Functional groups?

Ans. An atoms or a group of atoms that determine the characteristics properties of an organic compound is called functional group.

104. Difference b/w Alcohol group, Phenol ,Ether group and Difference b/w Aldehyde group, ketone group, carboxylic acid groups?

Ans. Alcohol group:- A group of organic compounds containing -OH functional group in their molecules is called alcohol. Their general formula is ROH, where 'R' is represented an alkyl group.

Phenol group:- A group of organic compound in which R-OH is present as functional group, but here R represents an aryl group.

Ether group:- Organic compound having two alkyl groups attached with an oxygen atoms are called ether. The functional group of ether is -O- or R-O-R' where R and R' are alkyl or aryl group which may be same or different.

Aldehyde Group:- Organic compounds containing -C-H functional group are called aldehydes. Their general formula is R-CHO, where R may be H atom or any alkyl or aryl group.

Ketone Groups:- Organic compounds containing -C- functional group are called ketones. Their general formula is R-C-R' where R and R' are alkyl and aryl group, either same or different.

Carboxylic acid Groups:- Organic compounds containing -C-OH functional group are called carboxylic acid. Their general formula is RCOOH, where R may be -H, any alkyl or aryl group.

105. Describe the functional groups of alkenes and alkyne? Differentiate b/w the functional group of amines and amides?

Ans. The main difference is that an amine has a nitrogen atom bonded to one or more alkyl or aryl groups, while an amide has a nitrogen atom bonded to a carbonyl group (C = O).

Amines:-A nitrogen atom bonded alkyl or aryl group. (R - NH2, R - 2NH, R - 3).

Amides:-A nitrogen atom bonded to a carbonyl group (C=O)(R - CO - NR2).

Alkanes have no functional group, as they are saturated hydrocarbons consisting only of single carbon- hydrogen bonds. The functional group for alkynes is a carbon - carbon - triple bond. (C ≡ C).

Chapter no 15:- Hydrocarbons

106. Difference b/w Alkanes, Alkenes, Alkynes? and write its general formula also?

Ans. The main difference is the type of carbon - carbon bond. Alkanes have single bonds, alkenes have at least one double bond, and alkynes have at least one triple bond.

General formulas:- alkane = CnH2n+2 , alkenes = CnH2n , alkynes = CnH2n- 2.

107. Difference b/w chlorination and Combustion, write one reaction also?

Ans. Alkanes react with chlorine in the presence of sunlight by replacing one or more atoms of hydrogen with chlorine. This reaction is known as chlorination. Example:-

CH4+ Cl2 sunlight → CH3Cl+ HCl

- Combustion is the process of burning of a substance in the presence of oxygen is also known as combustion. Example:-

CH4+O2 flame → CO2 + H2O + heat.

108. Define cracking reaction of hydrocarbons ? Using an example, define hydrogenation reaction?

Ans. Cracking is the process of breaking down large,long- chain hydrocarbon molecule into smaller, more useful one likes gasoline or diesel fuel, through thermal decomposition using high heat and pressure, or catalytically with the help of a catalyst.

Hydrogenation is a chemical reaction that adds hydrogen to a molecule typically breaking a double or triple bond to form a saturated compound. for example- ethene ,an unsaturated molecules with a double bond , can be hydrogenated to form ethane, a saturated molecule with a single bond by reacting it with hydrogen in the presence of a catalyst like nickel.

109. How is hydrogenation of alkenes and alkynes carried out? Give the two methods of preparation of alkanes?

Ans. Hydrogenation of alkenes and alkynes is carried out by adding hydrogen gas across the double or triple bond in the presence of a metal catalyst like nickel, platinum, or palladium. This reaction converts unsaturated compounds (alkenes, alkynes) into saturated ones (alkanes).

Two common methods for preparing alkanes are wurtz reaction, which couples two alkyl halides using sodium and reduction of alkyl halides, where an alkyl halide is reduced to an alkane using a metal and acid (like Zn/HCl).

Chapter no 16:- Biochemistry

110. Define carbohydrates and How also the carbohydrates as a source of energy?

Ans. Carbohydrates are the biomolecules made up of carbons, hydrogen and oxygen. Their general formula is Cn(H2O)m.

The carbohydrates when taken as foods are broken down in our bodies into glucose by digestive juices. Glucose is directly absorbed by our bodies. Glucose is transported by blood stream to all body cell tissues and organs , where it provides energy.

111. Define protein? Write three sources and functions?

Ans. Protein is an essential biomolecule composed of long chains of amino acids which perform a vast range of function in the body, including building tissues, catalyzing metabolic reactions transporting molecules and providing structural support.

OR

Protein are complicated nitrogenous compounds made up of amino acids. They are made up of carbon, hydrogen and oxygen, and sulphur element. Proteins are bigger molecules of amino acids. Protein are present in all living organisms. They are found in muscle skin, nails, hair, wool, feather etc.

- Sources of animal protein are meat, mutton, fish, egg etc. These proteins are used as food by human beings.

- Another type of proteins are enzymes that are produced by living cell. They catalyze the chemical reaction taking place in the body.

- Hides are also proteins. They are used to prepare leather items like shoes, jackets, sports item.

112. Define lipids? And write its uses?

Ans. Lipids are esters of long chain fatty acid with glycerol. As glycerol form esters with three fatty acids, therefore they are called triglycerides. They are insoluble in polar solvent like water but soluble in organic solvents.

- Animals fats are obtained from milk as butter and ghee etc which are used for cooking and frying food items. Animal fats are also used in soap industry.

- Plants synthesze oils and store them in seeds. Different oils obtained from seeds of sunflowers, coconut and corn. These oils are used as vegetable oil or ghee for other cooking other purposes.

- Marine animals like salmon and whales are also good source of oils. These oils are used as medicines, e.g. cod fish liver oil.

113. Difference b/w oils and fats?

Ans. Fats:-

- They are solid.
- They are derived from animals.
- Fats are made of saturated fatty acids.
- Butter, cream, meat and etc.

Oils:-

- They are liquid.
- They are usually derived from plants.
- They are made of unsaturated fatty acids.
- Corn, peanut, vegetable, olive, sunflower oil etc.

114. Define nucleic acid?

Ans. Nucleic acids are essential components of every living cell. They are chemically long chain compounds formed by a repeating units called nucleotides. It is made up of nitrogen, carbon, hydrogen, oxygen, phosphoric acid groups.

115. Difference b/w Deoxyribonucleic acid and ribonucleic acids?

Ans. Deoxyribonucleic acids:-DNA is the permanent storage place for genetic information in the nucleus of a cell. It passes these information's as instructions from generation to generation for the synthesis of a particular protein.

Ribonucleic acids:-The RNA is synthesized by DNA to transmit the genetic information. It receives, reads& decodes and uses the given information to synthesize new proteins.

116. Why is food essential for living things? What is the functions of carbohydrates in our bodies?

Ans. Food is essential for the living things because it provides the energy needed for overall life processes, supplies the nutrients necessary for growth and repair and helps maintain bodily functions.

Carbohydrates provide the body's main source of fuel, powering the central nervous system and muscles.

117. What is meant by balance diet? Carbohydrates are prepared by plant comment?

Ans. Plants prepare carbohydrates through the process of photosynthesis using simple raw materials and energy from sunlight.

A diet consisting of a variety of different types of foods and providing adequate amounts of the nutrients necessary for good health.

118. Define nutrition and nutrients? Name the elements found in proteins?

Ans. Nutrition is the process of taking in food and using it for growth repair, and maintaining life, involving consumption digestion absorption and utilization of food by body.

Nutrients are the specific chemical compounds in food that the body needs to function properly including protein, fats, vitamins, minerals and water.

Proteins are primarily composed of carbon, hydrogen, oxygen and nitrogen.