Practice Questions and Answers

PHYSICS

For

Senior Secondary School

1

EDUBASE

QUESTIONS

TOPIC: CURRENT ELECTRICITY

DIRECTION: Choose the correct answer from the lettered options.

1. Which of the following is an electrolyte?

A. Sugar solution

B. Alcohol

C. Paraffin

D. Grape juice

2. An equipment whose power is 1500W and resistance 375 Ohms would draw a current of _____.

A. 0.01A

B. 2.00A

C. 4.00A

D. 77.50A

3. A voltmeter has a resistance of 4500Ω and is calibrated to read 2V per division. If the instrument is required to read 10V per scale division; what series resistance must be connected to it?

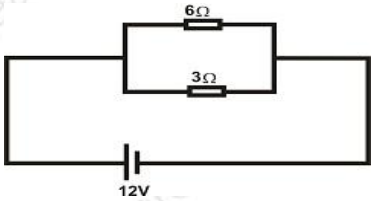
A. 18,000Ω.

B. 19,000Ω.

C. 20,000Ω.

D. 18,500Ω.

4. In the diagram drawn, the ratio of the electric power dissipated in the 6Ω and 3Ω resistors respectively is _____.



A. 1:2

B. 1:3

C. 2:1

D. 2:3

5. A wire of length 15m made of a material of resistivity 1.8×10−6Ωm has a resistance of 0.27W. Determine the area of the wire.

A. 1.5 × 10-4m2

B. 1.0 × 10-4m2

C. 2.7 × 10-5m2

D. 7.3 × 10-6m2

6. Which of the following is an essential property of the wire used for making fuses?

A. High thermal conductivity

B. Low melting point

C. Low electrical resistivity

D. Thick diameter

7. The value of a resistivity wire is 1.1 x 10-6Ωcm and the resistance of the wire is 7.029 x 10-5Ω. Then the length of the wire is _____, if the wire has a diameter of 0.3mm.

A. 65cm

B. 40cm

C. 80cm

D. 64cm

8. The function of the system of granulated carbon mixed with manganese (IV) oxide in a Leclanche' cell is to _____.

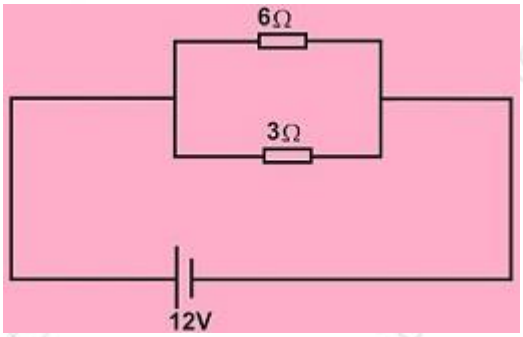
A. increase the e.m.f of the cell to 2.0V

B. prevent local action in the cell

C. prevent polarization in the cell

D. make the cell black and hence a good radiator

9. In the diagram drawn, the ratio of the electric power dissipated in the 6Ω and 3Ω resistors respectively is _____.



A. 1:2

B. 1:3

C. 2:1

D. 2:3

10. Two resistors of resistances 100Ω and 200Ω are arranged in parallel and connected to 240V d.c source, the current in the circuit is _____.

A. 3.6A

B. 0.08A

C. 5A

D. 8A

11. The point through which current enters and leaves an electrolytic substance is called _____.

A. terminals

B. escape point

C. electrodes

D. outlets

12. Which of the following does not govern the resistivity of a material?

A. Current, I.

B. Resistance, R.

C. Area of material.

D. Length of material.

13. A short chain is sometimes attached to the back of a petrol tanker to _____.

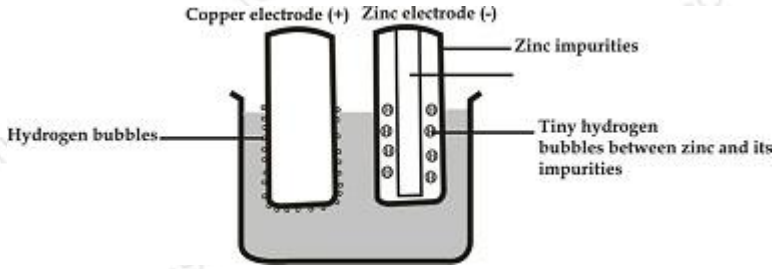
A. generate more friction

B. ensure the balancing of the tanker

C. caution the driver when over speeding

D. conduct excess charges to the earth

14. What type of defect can be given to the diagram drawn?



A. Polarization

B. Local action

C. Lead acid accummation

D. Zinc action

Use the information to answer the question.

15. The diagram shows resistors connected in _____.

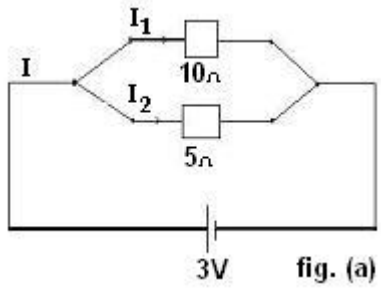


fig. (a)

A. series

B. parallel

C. non-parallel

D. all of the above

16. A resistance of 5Ω is in series with one of 6Ω and a p.d. of 33V is applied across the whole arrangement. Find the current in each wire and the p.d. across each.

A. 3A, 15V, 14V.

B. 2A, 18V, 15V.

C. 3A, 15V, 18V.

D. 3A, 15V, 16V.

17. The only thing that cause motion is _____.

A. power

B. ability of the object to move

C. energy

D. force

18. A cell of e.m.f 1.5V is connected in series with a resistor of resistance 3 Ohms. A high resistance voltmeter connected across the cell registers only 0.9V. Find the internal resistance of the cell.

A. 5.0Ω

B. 4.5Ω

C. 2.4Ω

D. 2.0Ω

19. The resistance in a wire material is 6Ω. A current of 2.0A flows through it for 5secs. The energy given out in the information, is in the form of _____.

A. light energy

B. heat energy

C. electrical energy

D. photo energy

20. Which of the following instruments will accurately measure the e.m.f of a cell?

A. Ammeter

B. Avometer

C. Galvanometer

D. Potentiometer

21. Two resistors R1 and R2 are connected in parallel. R2 is greater than R1. The combined resistance is _____.

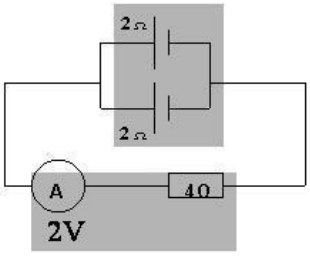
A. less than R1

B. greater than R2

C. the sum of R1 and R2

D. the difference of R2 and R1

22. The internal resistance of each of the cells in the figure drawn is 2 ohms. Calculate the total current in the circuit.



A. 0.8A

B. 0.56A

C. 0.40A

D. 0.004A

23. Find the effective resistance in the diagram drawn.

A. 6

B. 12

C. 18

D. 24

24. The terminal p.d. of a battery is 15V when an external resistance of 25Ω is connected and 18V when an external resistance of 40Ω is connected. Find the internal resistance of the battery.

A. 25Ω.

B. 20Ω.

C. 35Ω.

D. 15Ω.

25. A wire is 250cm long, 0.50mm in diameter and has a resistance of 3.0Ω. Another wire of the same material is 400cm long and 0.80mm diameter. What is the total resistance of the two wires when they are connected in series?

A. 1.875Ω.

B. 4.875Ω.

C. 1.125Ω.

D. 3.875Ω.

26. Which of the following material is a conductor?

A. Sodium

B. Glass

C. Plastic

D. Wax

27. Which of the following factors does not affect the electric resistance of a wire?

A. Length

B. Mass

C. Temperature

D. Cross-sectional area

Use the information to answer the question.

28. The voltage flowing across the circuit resistors is _____.

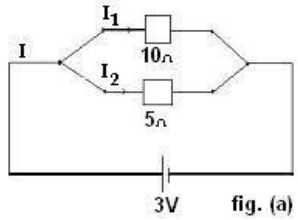


fig. (a)

A. parallel voltage

B. the same

C. different

D. series voltage

29. The determining factors when a steady current flows through a varying wire material of uniform length and resistance include all EXCEPT _____.

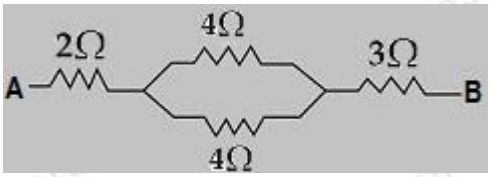
A. electric field intensity

B. resistivity

C. current density

D. electric energy

30. What is the resistance across AB?



A. 7.0 ohms

B. 11.0 ohms

C. 16.0 ohms

D. 8.0 ohms

31. A cell whose internal resistance is 0.5

Ω delivers current of 4A to an resistor. The lost voltage of the cell is _____.

A. 0.125V

B. 1.250V

C. 2.000V

D. 8.000V

32. Two resistance R1 = 6Ω and R2 = 5Ω are connected in parallel over a p.d given that P1 and P2 represent the power dissipated in R1 and R2. Find the ratio P12:P22.

A. 5:6.

B. 6:5.

C. 30:25.

D. 25:30.

33. A galvanometer of resistance 100Ω gives a full-scale deflection for current 10mA.I. If it is to be converted to read 1A, what will be the magnitude and arrangement of the resistor required?

A. 0.09-6Ω in parallel

B. 1.01Ω in parallel

C. 9.99Ω in parallel

D. 1.01Ω in series

34. In the wiring or earthing of houses, the fuse is connected to the wire coloured _____.

A. blue

B. brown

C. yellow

D. yellow and green

35. Which of the following is stored by a dry leclanche' cell?

A. Cellular energy.

B. Chemical energy.

C. Electric energy.

D. Electrical energy.

36. The e.m.f. of a coil is 6V and internal resistance 5Ω is connected across a resistor 2.5Ω. Find the current flowing in the circuit.

A. 2A.

B. 2.4A.

C. 3A.

D. 4A.

37. Electric appliances in homes are normally earthed so that _____.

A. the appliances are maintained at a higher p.d than the earth.

B. the appliances are maintained at a lower p.d than the earth.

C. both the a.c and d.c sources can be used.

D. a person touching the appliances is safe from electric shock.

38. When a ball rolls on a smooth level ground, the motion of its center is _____.

A. translational

B. oscillatory

C. random

D. rotational

TOPIC: CURVILINEAR MOTION

DIRECTION: Choose the correct answer from the lettered options.

Use the information to answer the question.

1. The radius of an atom is 10-10m. If an electron of mass 9 x 10-31kg has an angular velocity of 8πrad/secs. What is the force acting on the electron?

A. 5.76p^2 x 10-49N.

B. 5.76p x 10-49N.

C. 57.6 x 10-49N.

D. 57.6 x 10-50N.

2. If a body of 0.5kg is whirled in a horizontal circle at the rate of 1000 revolution per minute. Determine the angular velocity.

A. 16.7 rad/s

B. 1.67 rad/s

C. 167 rad/s

D. 0.167 rad/s

3. If a body of 0.5kg is whirled in a horizontal circle at the rate of 1000 revolution per minute at constant speed and the radius of the horizontal circle described is 40cm, what is the tension in the string?

A. 58.5N

B. 55.8N

C. 3.34N

D. 334N

4. The length of a displaced pendulum bob, which passes its lowest point twice in every second, is _____.

A. 0.25m

B. 0.45m

C. 0.58m

D. 1.00m

5. The force that tends to influence the motion of a vibrating body to bring it to an equilibrium state as in a simple harmonic motion is termed _____.

A. equilibrium force

B. harmonic force

C. restoring force

D. Hamiltonian force

6. I. The motion of tyres of a moving car.

II. The motion of a loaded test tube oscillating vertically.

III. The beating of the heart.

IV. A stone tied to a spring and whirled around

V. The motion of the piston in a gasoline engine.

Which of the motions above is simple harmonic?

A. I, III, IV and V only

B. II, III and V only

C. II, III and IV only

D. I, II and V only

7. An oscillating pendulum bob has a mass 0.1kg. Its amplitude is 0.01m and its period 2s, the constant ω in the acceleration formula is _____.

A. 31.42 rad/s

B. 0.3142 rad/s

C. 314.2 rad/s

D. 3.142 rad/s

8. If a wheel 1.2m in diameter rotates at one revolution per second, calculate the velocity of the wheel.

A. 3.6ms-1

B. 3.8ms-1

C. 4.0ms-1

D. 7.5ms-1

9. Given that in a simple pendulum experiment, the length was constant all the way. What is the basic variable that was varied?

A. The vibrations.

B. The period.

C. The increasing or decreasing length.

D. The mass of the bob.

10. A particle oscillating through a semi-circle has a radius of 2.0m and mass 0.3kg. Calculate the force acting on the particle if the frequency of oscillation is 7/22Hz.

A. 6N.

B. 2.4N.

C. 44N.

D. 1.2N.

11. The frequency of oscillation of a simple pendulum increases as the _____.

A. mass of the bob decreases

B. mass of the bob increases

C. length of the string decreases

D. none of the above

12. An object travel round a circle twelve times in 18sec. If its speed is three meter per seconds and its angular velocity is 4.2 rad/s, the radius of the circle is _____.

[Time to go round the circle once = 18/12 sec].

A. 0.67m.

B. 0.71m.

C. 0.19m.

D. 1.23m.

13. In oscillations, the coordinates of the centre of mass of the object changes _____.

A. rotationally

B. randomly

C. cyclically

D. translationally

14. A vertical string, suspended from a fixed point and a small mass attached to the free end is set into oscillations.

Which of the following statements about the system is correct?

I. The potential energy of the mass is a minimum at the middle of the swing

II. Its energy is at maximum at the middle of swing

III. The sum of the potential and kinetic energies is constant throughout the swing

A. I, II and III.

B. I and II only.

C. II and III only.

D. I and III only.

15. The length of a simple pendulum is varied as different masses are hung on it. At a point the length from ceiling to floor was 100cm. What is the period of the pendulum?

A. $2p^2/g$.

B. $2p^2\sqrt{L}/g$.

C. $2p\sqrt{L}/g$.

D. $4p^2/g$.

16. A one-naira coin rolling along the floor performs both _____.

A. translational and rectilinear motion

B. random and translational motion

C. oscillatory and rectilinear motion

D. translational and rotational motion

17. A boy timed 20 oscillations of a pendulum thrice and obtained 46.3s, 48.0s and 45.0s. The mean period of oscillation is _____.

A. 46.430s

B. 46.300s

C. 2..400s

D. 2.312s

18. A stone is whirled round a circular path of radius 15cm. If the stone makes 30 oscillations in 10seconds, calculate the angular speed of the stone. [π = 3.14].

A. 9.42 $rads^{-1}$

B. 12.56 $rads^{-1}$

C. 18.84 $rads^{-1}$

D. 62.80 $rads^{-1}$

19. A mass of 5g attached at the end of a spring was displaced vertically by 10cm, released and allowed to oscillate. Find the energy possessed by the 5g mass as it undergoes simple harmonic motion.

A. 2.5 × 10-3J

B. 2.5 × 10-4J

C. 2.5 × 10-2J

D. 2.5 × 10-5J

20. The equation given by time, t = √ [2s/g] where s= distance and g = gravitational acceleration shows that

A. time is mass independent.

B. time is a factor of mass.

C. time could be a constant.

D. only time can be valued from the equation.

21. In circular motion a force acting in a direction towards the centre of the circle is called _____.

A. contact force

B. non-contact force

C. centripetal force

D. friction force

22. Which of the following explains the movement of an object in a circular path?

i. Its velocity is constant

ii. It has constant acceleration directed away from the center

iii. The centripetal force is directed towards the center.

iv. It has constant acceleration directed towards the center.

A. I and III

B. I and IV

C. II and III

D. II and IV

23. A piece of stone attached to one end of a string is whirled round in a horizontal circle and the string suddenly cuts. The stone will fly off in a direction _____.

A. parallel to the circular path

B. towards the center of the circle

C. perpendicular to the circular path

D. tangential to the circular path

24. A body of mass 40g is suspended from the end of a spiral spring whose force constant is 0.8N m-1. Find the period of motion.

A. 5.04s

B. 6.08s

C. 1.40s

D. 7.07s

25. The period, T of a vibrating particle with speed 2.0secs and wavelength, λ 0.5m is _____.

A. 4.0secs

B. 0.4secs

C. 0.25secs

D. 0.52secs

26. A sealed tube of uniform cross-sectional area 3 x 10-4m2, is loaded with lead shot so that, it can float upright in oil of density 700kg/m2. If the total mass of the tube is 150g. Find the depth of immersion of tube in the coil.

A. 714.3m

B. 0.5m

C. 7m

D. 0.7m

27. An oscillating pendulum bob has a mass 0.1kg. Its amplitude is 0.01m and its period 2s. Find the maximum acceleration.

A. 0.099m/s^2

B. 0.99m/s^2

C. 9.9m/s^2

D. 0.03142m/s^2

28. A simple pendulum has a length of 1.5m and a bob of mass 0.2 kg, the period of oscillation will be _____.

A. 2.4s

B. 0.24s

C. 24s

D. 0.024s

29 Calculate the velocity of a particle with acceleration 25m/s2 over a circle of radius 1m.

A. 3.2m/s.

B. 0.52m/s.

C. 4m/s.

D. 5.0m/s.

30. Two simple pendulums X and Y oscillates at the same time. What is the period of pendulum Y which makes 500 vibrations in the time that X makes 400 vibration over a period of 1.5secs?

A. 1.2secs.

B. 1.875secs.

C. 1.9secs.

D. 2.0secs.

31. An object moves with uniform speed round a circle, its acceleration has _____.

A. constant magnitude and constant direction

B. constant magnitude and varying direction

C. varying magnitude but constant direction

D. varying magnitude and varying direction

32. If a graph of length, L and period T2 of a simple pendulum is plotted. From the information, the slope can be said _____.

A. to be a constant

B. to be a variable

C. to be a variation of length, L with period, T

D. all of the above

33. Which of the following is NOT an example of forced vibration?

A. A loaded test tube oscillating vertically in a liquid

B. The vibrations of the diaphragm of loud speaker

C. The vibrating body of a violin

D. A vibration turning fork pressed against a table top

34. A simple pendulum has a period of 17.0s. When the length is shortened by 1.5m, its period is 8.5s. Then the original length of the pendulum is _____.

A. 1.5m

B. 2.0m

C. 3.0m

D. 4.0m

TOPIC: DENSITY AND RELATIVE DENSITY

DIRECTION: Choose the correct answer from the lettered options.

1. The mass of a stone is 15g when completely immersed in water and 10g when completely in a liquid of relative density 2.0. What is the mass of the stone in air?

A. 25g.

B. 20g.

C. 30g.

D. 35g.

2. If kerosene of density 0.8g/cm3 is mixed with water of 8g, what is the density of the resulting mixture?

[Take mass of kerosene = 32g]

A. 0.83g/cm^3.

B. 6.25g/cm^3.

C. 8.00g/cm^3.

D. 0.55g/cm^3.

3. A heavy bucket of water is lowered down in a well. The upthrust experienced by the bucket of water is _____.

A. U = W + T

B. U = T – W

C. U = W – T

D. W = U – T

4. If a solid X floats in liquid P of relative density 2.0 and in liquid Q of relative density 1.5. It can be inferred that _____.

A. weight of P displaced is greater than that of Q

B. weight of P displaced is less than that of Q

C. volume of P displaced is greater than that of Q

D. volume of P displaced is less than that of Q

5. If kerosene of density 0.8g/cm3 is mixed with water of 8g, what is the density of the resulting mixture?

[Take mass of kerosene = 32g]

A. 0.83g/cm^3.

B. 6.25g/cm^3.

C. 8.00g/cm^3.

D. 0.55g/cm^3.

6. The mass of a stone is 15g when completely immersed in water and 10g when completely in a liquid of relative density 2.0. What is the mass of the stone in air?

A. 25g.

B. 20g.

C. 30g.

D. 35g.

7. The weight of a solid is measured in air and in a certain liquid of density 0.7g/cm3. If the weight of the solid in air and liquid are 0.09N and 0.02N. Determine the solid's volume.

A. 20cm^3.

B. 15cm^3.

C. 10cm^3.

D. 5cm^3.

8. A heating coil rated 1000W is used to boil off completely 2kg of boiling water. The time required to boil off the water is _____.

[specific latent heat of vaporization of water = 2.3 x 106Jkg^{-1}].

A. 1.15 x 104s

B. 1.15 x 103s

C. 4.6 x 104s

D. 4.6 x 103s

9. A cube of sides 0.2m hangs freely from a string. What is the upthrust on the cube when totally immersed in water?

A. 8OOON

B. 8OON

C. 11ON

D. 8ON

10. If kerosene of density 0.8g/cm3 is mixed with water of 8g, what is the density of the resulting mixture?

[Take mass of kerosene = 32g]

A. 0.83g/cm3.

B. 6.25g/cm3.

C. 8.00g/cm3.

D. 0.55g/cm3.

[Density of water = 1000kgm−3, g = 10ms-2]

11. A cube of sides 0.1m hangs freely from a string. What is the upthrust on the cube when totally immersed in water?

A. 1OOON

B. 7OON

C. 11ON

D. 1ON

TOPIC: ELASTIC PROPERTIES OF SOLIDS

DIRECTION: Choose the correct answer from the lettered options.

1. True stress-strain curve need to be corrected after _____.

A. elastic limit

B. yield limit

C. tensile strength

D. no need to correct

2. If a force of 50N stretches a wire from 20m to 20.01m, what is the amount of force required to stretch the same material from 20m to 20.05m?

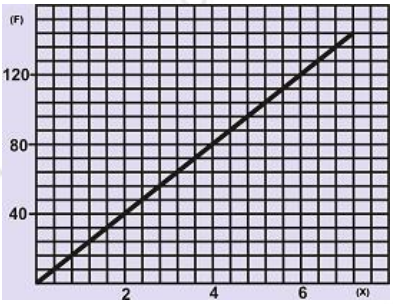
A. 50N

B. 100N

C. 200N

D. 250N

3. The diagram drawn represents the graph of the force (F) applied in stretching a spiral spring against the corresponding extension (X). The force constant of the spring is _____.



B. 40Nm-1

C. 30Nm-1

D. 10Nm-1

4. A metal teapot X and a china teapot Y break when they fall on a concrete floor, then _____.

A. X and Y can each be put together again

B. X is broken because it is brittle

C. Y is broken because it is brittle

D. the metal of C has no dislocations.

5. Hooke's law states that _____.

A. elastic range, strain is proportional to stress

B. plastic range, strain is proportional to stress

C. in both elastic and plastic range, strain is proportional to stress

D. none of the above

6. Which of the following elements is a covalently bonded crystal?

A. Aluminum

B. Sodium chloride

C. Germanium

D. Lead

7. A load of 20N on a wire of cross-sectional area 8 x 10-7m2 produces an extension of 10-4m, if the length is 3m, then the Young's Modulus for the material of the wire is _____.

A. 7.0 x 1011Nm-2

B. 7.5 x 1011Nm-2

C. 8.5 x 1011Nm-2

D. 9.0 x 1011Nm-2

8. Malleability of a metal is _____.

A. the ability to withstand compressive stresses

B. the ability to withstand deformation under shear

C. the property by which a material can be cold-worked

D. the ability to undergo permanent deformation

9. Annealing is generally done to impart _____.

A. hardness to the material

B. softness to the material

C. brittleness to the material

D. high conductivity to the material

10. The diagram drawn represents the graph of the force (F) applied in stretch a spiral spring against the corresponding extension(x). The force constant of the spring is _____.

A. 17N m-1

B. 40N m-1

C. 30N m-1

D. 10N m-1

11. A spring of force constant 500Nm-1 is compressed such that its length shortens by 5cm. The energy stored in the spring is _____.

A. 0.625J

B. 6.250J

C. 62.500J

D. 625.000J

12. Rubber and glass are widely used in industry. Which of the statements A to D is correct?

A. The stress-strain curves of the two materials are similar.

B. Glass has a definite melting-point.

C. Rubber has a low strain when initially stretched.

D. Glass has no dislocations.

13. The preheating of parts to be welded and slow cooling of the welded structure will reduce _____.

A. cracking and incomplete fusion

B. cracking and residual stress

C. residual stress and incomplete penetration

D. cracking and underfill

14.Which of the following is /are correct about crystals?

I. They are soluble

II. They have no definite melting point

III. They can be hydrous or anhydrous

IV. An example of these is glass.

A. I only

B. IV only

C. I and III only

D. I, II, III, and IV

15. Change in elastic modulus for ordinary materials between OK and melting point is _____.

A. 10-20% increase

B. 10-20% decrease

C. 80-90% decrease

D. 80-90% increase

16. If a material is subjected to two incremental true strains namely e1 and e2, then the total true strain is _____.

A. ε1 × ε2

B. ε1 − ε2

C. ε1 + ε2

D. ε1/ε2

17. High elastic modulus in materials arises from _____.

A. high strength of bonds

B. weak bonds

C. combination of bonds

D. none of the above

18. Plastic deformation results from which of the following?

A. Slip

B. Twinning

C. Both

D. None of the above

19. The property of a material by which it can be drawn into wires is known as _____.

A. ductility

B. elasticity

C. softness

D. tempering

20. _____ is the resistance to plastic deformation.

A. Toughness

B. Brittleness

C. Hardness

D. Malleability

21. When very hot water is poured into identical thin and thick glass tumblers in equal volumes, the thick one cracks because _____.

A. glass is a good conductor of heat

B. glass is a crystal

C. of the uneven expansion of glass

D. of the even expansion of glass

22. The correct order of the co-ordination number in simple cubic, body centered cubic and face centered cubic of unit cell is _____.

A. 6, 8, 12

B. 8, 12, 12

C. 12, 8, 12

D. 6, 8, 8

23. A greased needle gently placed on water has an effect of _____.

A. causing the water temperature to rise

B. increasing the force of adhesion

C. increasing the surface tension of the water

D. reducing the density of the water

24. Figure-out the odd point in the following.

A. Proportional limit

B. Elastic limit

C. Yield point

D. Fracture point

25. _____ is the ability to resist crack growth.

A. Toughness

B. Malleability

C. Hardness

D. Ductility

26. The correct order of the coordination number is SC (simple cubic), BCC (body centered cubic), FCC (face centered cubic) and HCP (hexagonal close packed) unit cells is _____.

A. 12, 8, 12, 6

B. 6, 8, 12, 12

C. 8, 6, 12, 12

D. 6, 12, 12, 8

27. A spring of length 25cm is extended to 30cm by a load of 150N attached to one of its ends. What is the energy stored in the spring?

A. 3750J

B. 2500J

C. 3.75J

D. 2.50J

28. Which of the following is not the purpose of full annealing?

A. Refines grains

B. Induces softness

C. Removes strains and stresses

D. Produces hardest material

29. How many neighboring particles are there in a face-centered cubic crystal?

A. 2

B. 4

C. 6

D. 8

30. Toughness of a material is equal to area under _____ part of the stress-strain curve.

A. elastic

B. plastic

C. both

D. none of the above

31. Shape of true stress-strain curve for a material depends on _____.

A. strain

B. strain rate

C. temperature

D. all of the above

32. Which of the following properties of a long steel bar would alter if the bar were melted, recast into a cube and allowed to cool to its original temperature?

A. Density

B. Volume

C. Specific heat capacity

D. Electrical resistance

33. The ability of an object to regain its original shape after an external force, which deformed it, has been removed is called _____.

A. dislocation

B. distortion

C. elasticity

D. restoration

34. Time dependent permanent deformation is called _____.

A. plastic deformation

B. elastic deformation

C. creep

D. an elastic deformation

35. When stretched beyond its elastic limit, a metal rod such as steel _____.

A. becomes plastic

B. becomes colder

C. obeys Hooke's law

D. has no energy

36. The energy contained in a wire when it is extended by 0.02m by a force of 500N is _____.

A. 5J

B. 10J

C. 103J

D. 104J

TOPIC: FLUIDS AT REST AND IN MOTION

DIRECTION: Choose the correct answer from the lettered options.

1. The terminal velocity of a ball-bearing falling through a viscous fluid is reached when the _____.

A. upthrust is equal to the weight of the ball

B. ball accelerates uniformly

C. upthrust is equal to the velocity of the ball

D. velocity is uniform

2. A seated flask contains 600cm3cm of air at 27°C and is heated to 35°C at constant pressure. The new volume is _____.

A. 508cm3

B. 516cm3

C. 608cm3

D. 616cm3

3. A mass of gas occupies 20m3 at 5°C and 760mm pressure. Determine its volume at 30°C and 800mm pressure.

A. 20.7m3

B. 2.07m3

C. 0.207m3

D. 114m3

4. What happens when a gas expands at constant temperature?

A. Its pressure decreases.

B. The total momentum of its molecules remains constant.

C. Its pressure decreases and the total momentum of its molecules remains constant.

D. Its pressure decreases and the total kinetic energy of its molecules decreases.

5. Which of the following explains why an insect will float on water?

i. There is tension on the water surface

ii. Kerosene reduces the density of water so that the insect becomes denser than water.

iii. Kerosene reduces the surface tension of water.

A. i only

B. ii only

C. iii only

D. i and iii only

6. A body weighs 10N in air. When partially immersed in water, it displaces water of mass 0.3kg, the upthurst on the body is _____.

[g = 10m/s2].

A. 0.3N

B. 0.5N

C. 3.0N

D. 7.0N

7. The stylus of a phonograph record exerts a force of 7.7 x 10−2N on a groove of radius 10−5m. Compute the pressure exerted by the stylus on the groove.

A. 4.90 x 108 Nm−2

B. 2.42 x 109 Nm−2

C. 3.45 x 108 Nm−2

D. 2.45 x 108 Nm−2

8. A given mass of chlorine occupies 38cm3 at 20°C. Determine its final volume at 45°C, pressure remains constant.

A. 41.2cm^3

B. 4.12cm^3

C. 0.412cm^3

D. 42cm^3

The correct answer is option [A].

Using the formula:V2/T2 = V1/T1

9. When the volume of a given mass of gas is halved and its temperature doubled, the pressure _____.

A. remains constant

B. increases by a factor of 4

C. increases by a factor of 3

D. decreases by a factor of 4

10. A decrease in the temperature of a given volume of gas gives rise to a/an

I. decrease in kinetic energy of the molecules

II. increase in the mean speed of the molecules

III. increase in the momentum change during collision

IV. decrease in the number of collisions per second

Which of the statements above is /are correct?

A. I only.

B. II only.

C. II and III only.

D. I and IV only.

11. A motor tyre is inflated to a pressure of 2×105Nm-2 when the temperature of air is 27°C. What will be the pressure in it at 87°C assuming that the volume of the tyre does not change?

A. 2.6 × 105Nm-2

B. 2.4 × 105Nm-2

C. 2.2 × 105Nm-2

D. 1.3 × 105Nm-2

12. An empty density bottle weights 2N. If it weighs 5N when filled with water and 4N when filled with olive oil, the relative density of olive oil is _____.

A. 1 /3

B. 2 /3

C. 1/5

D. 2/5

13. A body of mass 36kg falls through a viscous liquid which offers a drag force of 260N on the body. The upthrust on the body at terminal velocity is _____.

A. 50N

B. 100N

C. 310N

D. 620N

14. Two liquids L1 and L2 are contained in a U-tube. The height and the density of L1 are 8cm and 103kg m-3 respectively. If the density of L2 is 800kg m-3, its height measured from the same level is _____.

A. 16cm

B. 12cm

C. 10cm

D. 8cm

15. The change in volume when 450kg of ice is completely melted is _____.

[density of ice = 900kg m-3, density of water = 1000kg m-3].

A. 4.50m^3

B. 0.50m^3

C. 0.45m^3

D. 0.05m^3

16. A flask weighs 50.26g when completely empty, and weights 50.94g when full of air at 35°C and 80cmHg. What is the density of the air at S.T.P if the capacity of the flask is 500cm3?

A. 0.84kg/m3

B. 1.45kg/m3

C. 0.95kg/m3

D. 0.68kg/m3

17. A gas at 27°C is heated at constant pressure so that its volume is doubled. The new temperature is _____.

A. 5400K

B. 600K

C. 270K

D. 60oC

18. The pressure of 3moles of an ideal gas at a temperature of 27°C having a volume of 10-3m3 is _____.

[R = 8.3 Jmol-1K-1]

A. 2.49 x 105 Nm-2

B. 7.47 x 105 Nm-2

C. 2.49 x 106 Nm-2

D. 7.47 x 106 Nm-2

19. An ice cube floats in a glass of water filled to the brim. What happens when the ice melts?

A. The water level remains the same.

B. There is a drop in the level of water in the glass due to condensation on its outside.

C. The water in the glass overflows.

D. The level of water drops because melted ice occupies less volume.

20. A mass of gas at a temperature of 157°C and pressure of 760mmHg is cooled to 27°C. Calculate its pressure if the volume remains constant.

A. 48mmHg

B. 131mmHg

C. 530mmHg

D. 570mmHg

21. A hydraulic press has a large circular piston of radius 0.8m, and a circular plunger of radius 0.2m. A force of 500N is exerted by the plunger. Find the force exerted on the piston.

A. 8000N

B. 4000N

C. 2000N

D. 31N

22. Which of the options is not a precaution to be taken when verifying Boyle's law?

A. Difference in mercury column both arms must be taken when they are steady

B. The air must be dry

C. Ensure that the temperature does not vary

D. Making sure the tube is kept vertically

23. A parachute attains a terminal velocity when _____.

A. its density is equal to the density of air

B. the viscous force of air and the upthrust completely counteracts its weight

C. it expands as a result of reduced external pressure

D. the viscous force of the air is equal to the sum of the weight and upthrust

24. The pressure P, volume V and absolute temperature T of a given mass of an ideal gas changes simultaneously. Which of the following equation is correct about the gas?

A. PV = constant/T

B. P/T = constant

C. P/V = constant/T

D. I/T = constant/PV

25. A copper disc X has a circular hole Y in it. When the disc is heated _____.

A. X and Y have the same area as before

B. the area of X and the area of Y both increase

C. the area of X decreases, the area of Y increases

D. the area of X increases, the area of Y decreases

The correct answer is option [B].

26. A plastic sphere floats in water with 50% of its volume submerged. If it floats in glycerine with 40% of its volume submerged, density of glycerine is _____.

[density of water = 1000kgm-3].

A. 1400kgm-3

B. 1250kgm-3

C. 500kgm-3

D. 1000kgm-3

27. The pressure of two moles of an ideal gas at temperature of 27oC and volume 10-2m3 is ____.

[R = 8.313Jmol-1K-1]

A. 4.99 x 10-5Nm-2

B. 9.80 x 10-5Nm-2

C. 4.98 x 10-5Nm-2

D. 9.80 x 10-5Nm-2

28. Before starting a journey, the tyre of a car was 3 x 105Nm-2 at 27°C. At the end of the journey, the pressure rose to 4 x 105Nm-2. Calculate the temperature of the tyre after the journey assuming that the volume is constant.

A. 400°C

B. 300 °C

C. 273 °C

D. 127 °C

TOPIC: HEAT

DIRECTION: Choose the correct answer from the lettered options.

1. The volume of a gas in a gas thermometer is 50cm^3 at 0°C. When the temperature is 100°C the volume of the gas is 85cm^3. What would be the temperature when the volume is 65cm^3?

A. 42.9°C

B. 233.3°C

C. 76.5°C

D. 58.8°C

2. If the length of a cylindrical solid metal is Lcm at 30°C and the linear expansivity is α, what is the ratio of the new volume to the initial volume at 70°C?

A. 120α

B. 80α

C. 1 + 80α

D. 1 + 120α

3. Alcohol in glass thermometer has the advantage of _____.

A. higher expansivity than mercury in glass

B. not easily vaporizing than mercury

C. not wetting glass unlike mercury

D. greater conductivity than mercury

4. What happens when a certain quantity of pure ice is completely changed to water at 0°C?

A. Latent heat is absorbed, the mass remains constant and the volume decreases.

B. Latent heat is given out, the mass is constant and the volume decreases.

C. Latent heat is given out, the mass increases and the volume remains constant.

D. Latent heat is absorbed, the mass decreases and the volume increases.

5. Which of the following can be used to regulate temperature?

A. Fused metal

B. Bimetallic strip

C. Thermistor

D. Platinum strip

6. A floating block floats on a warm water placed in a bucket till it completely melt. What will happen to the warm water?

A. Diluted and increase.

B. Its volume will increase and temperature also decrease.

C. Its temperature will decrease but its volume will remain the same.

D. Its volume will first decrease and then increase with reduced temperature.

7. A bridge made of steel is 600m long. What is the daily variation in length if the night time and day time temperatures are 10°C and 35°C respectively?

The linear expansivity for steel is 0.000012 C-1

A. 0.18cm

B. 1.80cm

C. 18.0cm

D. 180cm

8.

I. Reproducibility

II. Sensitivity

III. High accuracy

IV. High thermal capacity

Which of the options are qualities of a good thermometer?

A. II, III and IV only

B. I, II and III only

C. I, II and IV only

D. I, III and IV only

9. _____ is the temperature of a mixture of pure ice and water at normal pressure.

A. Latent heat of fusion of ice

B. Latent heat of vaporization of ice

C. Ice maximum temperature

D. Lower fixed point of ice

10. A temperature scale has a lower fixed point of 40mm and an upper fixed point of 200mm. What is the reading on this scale when the thermometer reads 60°C?

A. 33.3mm

B. 36.0mm

C. 96.0mm

D. 136.0mm

11. An iron rod is 450cm long at 0°C. It is mounted alongside a copper rod and both are always maintained at the same temperature. When they are heated to 100°C. It is found that the difference in their lengths is the same as it was at 0°C. Find the length of the copper rod at 0°C.

[Linear expansivity of iron = 1.09 x 10-5/K, and superficial expansivity of copper = 3.64-5/K]

A. 389.3cm.

B. 296.51cm.

C. 260.95cm.

D. 269.51cm.

Hint: $\Delta l_c = \Delta l_i$,
where Δl_c = change in length of copper, and Δl_i = change in length of iron. Then, $\Delta l_c = l_c \alpha_c \theta$ and $\Delta l_i = l_i \alpha_i \theta$
where l_c = length of copper, and l_i = length of iron.
Also α_c= linear expansivity of copper, and α_i = linear expansivity of iron.

12. Calculate the heat required to change 0.45kg of water at 40°C to steam at 100°C.

(Take latent heat of vapourization of water = 2.26 x 106J/kg).

A. 1.13MJ

B. 11.3MJ

C. 113MJ

D. 1130MJ

13. Evaporation is affected by all EXCEPT _____.

A. wind and air dryness

B. the liquid's nature

C. temperature

D. the freeness of the liquid

14. The total capacity of a glass flask and its tube is 1000cm^3, if it is filled with oil at 25°C and the temperature is later lowered to 20°C, find the change in liquid level in tube, if the cross sectional area of the tube is 1cm^2.

(Coefficient of real expansion of oil = 5.4 x 10-4/K, coefficient of linear expansion of glass = 8.0 x 10-6/K).

A. 0.12cm

B. 2.70cm

C. 2.58cm

D. 2.85cm

15. The melting point of a solid is given as 80oC. If 105J of heat is required that this temperature to melt 10g of the solid, the specific latent heat of fusion of the solid is _____.

A. 1.00 x 10^3JKg^{-1}

B. 1.25 x 10^5JKg^{-1}

C. 1.00 x 10^7JKg^{-1}

D. 8.00 x 10^8JKg^{-1}

16. A mass of water, m, at 100°C is added to another mass of water, m1 at a temperature t. The resulting temperature of the mixture is T. If the specific heat capacity of water is 4.2J/g/k, derive an expression for t in terms of other quantities.

A. $t = T - {}^{m}(100 - T)/m_1$

B. $t = T + {}^{m}(100 - T)/m_1$

C. $t = {}^{m}(100 - T)/m_1 - T$

D. $t = {}^{m}(100 - T)/m_1 + T$

17. The density of iron at 30°C is 4.8g/cm$^{3.}$ What is the density 80°C if the linear expansivity of iron is 1.2 x 10^{-5}/K?

A. 2.50g/cm^3

B. 3.80g/cm^3

C. 4.80g/cm^3

D. 4.79g/cm^3

18. Which of the following instrument is used for determining the upper fixed point of a thermometer?

A. Hypsometer

B. Voltmeter

C. Galvanometer

D. Calorimeter

19. A substance melts at 78°C. Find the melting point of the same substance in kelvin.

A. 351K.

B. 213K.

C. 151K.

D. 203K.

20. Which of these statements is true?

A. Apparent expansion is real expansion plus cubical expansion

B. Real expansion is apparent expansion plus cubical expansion

C. Cubical expansivity is real expansion plus apparent expansion

D. Real expansion is apparent expansion minus cubical expansion

21. Find the conversion of 250°F to celcius scale.

A. 121.1°C

B. 105.2°C

C. 175.3°C

D. 145.1°C

22. The advantage of the clinical thermometer over other thermometers is that it _____.

A. is very small

B. is very big

C. can be read at leisure

D. contains alcohol

23. Which of the following is not a method of making a thermometer quick-acting and sensitive?

A. Reducing the bore of the tube so that substantial volume of liquid can quickly fill the tube

B. Ensure that the liquid used must be one of high conductivity so that it can respond quickly to heat effect

C. Reducing the size of the bulb so as to contain large volume of liquid

D. Ensure that the thickness of the glass is thin

24. A metal X and a metal Y both lose the same quantity of heat when their temperature falls from 16°C to 10°C. The specific heat capacity of X is twice that of Y. Then the ratio mass of X/mass of Y is _____.

A. 3/2

B. 2/1

C. 1/ 2

D. 1/3

25 A beaker containing 605g of water at 35°C is heated uniformly until the water boils after 180s and gives off steam afterwards. With the heat source removed, ice at 0°C is added to

the remaining 600g of the boiling water to bring its temperature to 0°C. Find the mass of the ice added.

(Specific heat capacity of water = $4.2 \times 10^3 Jkg^{-1}K^{-1}$

Specific latent heat of steam = $2.2 \times 10^6 Jkg^{-1}$

Specific latent heat of ice = $3.2 \times 10^5 Jkg^{-1}$)

A. 354g

B. 489g

C. 189g

D. 276g

26. A platinum resistance thermometer wire has a resistance of 5ohms at 0°C and 5.5ohms at 100 C. calculate the temperature of the wire when the resistance is 5.2ohms.

A. 80°C

B. 60°C

C. 40°C

D. 10°C

26. A platinum resistance thermometer wire has a resistance of 5°hms at 0°C and 5.5°hms at 100°C. Calculate the temperature of the wire when the resistance is 5.2°hms.

A. 80°C

B. 60°C

C. 40°C

D. 10°C

27. 106J of heat is required to boil off completely 2kg of a certain liquid. Neglecting heat lost to surroundings, the latent heat of vaporization of the liquid is _____.

A. $5.0 \times 106J\ kg^{-1}$

B. $2.0 \times 106J\ kg^{-1}$

C. $5.0 \times 105J\ kg^{-1}$

D. 2.0 x 106J kg^{-1}

28. A copper calorimeter of mass 0.10kg contains 0.090kg of water at 10.0°C. When 0.010kg of ice at 0°C is added and allowed to melt, the temperature falls to 2.0°C. Calculate a value for the specific latent heat of fusion of ice. If the specific heat capacity of copper calorimeter = 400J/kgK and specific heat capacity of water = 4200J/kgK.

A. 3.26KJ/kg

B. 32.6KJ/kg

C. 326KJ/kg

D. 3260KJ/kg

29. Which of the following is not a property for thermometric liquid?

A. It must have a low density

B. It must have a low specific heat capacity

C. It must have low boiling point and high melting point so that both temperatures can be measured

D. it must have high coefficient of expansion

30. Which of the following is an advantage of thermoelectric thermometer?

A. They can give precise temperature values

B. It cannot be used to measure in small enclosures due to its bulky size

C. It can be used for taking high temperature values

D. It is very sensitive and gives an accurate measurement

31. The thermometric property of a thermocouple is the change in _____.

A. equivalent resistance

B. electromotive force

C. colour

D. pressure

32. A quantity of water at 0°C is heated to about 30°C. At each degree rise in temperature, its density will _____.

A. rise steadily

B. rise then fall

C. fall steadily

D. fall then rise

33. The phenomenon which occurs when liquid molecules change to vapour state at a particular temperature is called _____.

A. melting point

B. boiling point

C. evaporation

D. freezing point

34. A square plate of side 15cm is made of a metal of linear expansivity 2.0 x 10-5/K, if the thickness of the plate is 5mm and the plate is heated from 25°C to 80°C. What is the cubical increase?

A. 0.12cm^3

B. 0.25cm^3

C. 0.37cm^3

D. 0.74cm^3

35. The Hope's apparatus used to verify anomalous expansion of water gives satisfactory result _____.

A. when the experiment is carried out at 30°C

B. when the apparatus is placed on type of support

C. when the experiment is carried out in a cold room

D. when the Hope's vessel is made of steel

36. A liquid -in- glass can be made sensitive if the _____.

A. size of bulb is increased

B. bore of the tube is increased

C. thickness of the glass is increased

D. liquid used is one of low-conducting

37. The cubic expansivity of a liquid occurs in _____.

A. an in expansible vessel

B. an expansible vessel

C. a rigid vessel

D. none of the above

38. An iron cube has each edge 15cm long at 20°C. What will be the new surface area of a face when the temperature rises to 80°C?

A. 157.3cm^2

B. 467.8cm^2

C. 225.3cm^2

D. 337.5cm^2

39. Which of the following liquids is most suitable for making a maximum thermometer?

A. Glycerin.

B. Water.

C. Mercury.

D. Alcohol.

40. An electric kettle contains 500cm^3 of water at 25°C. Determine the heat required to bring the water to boiling.

(Latent heat of vaporization of water = 2.26 × 106J/kg).

A. 1.58 × 105J

B. 2.05 × 105J

C. 1.29 × 105J

D. 1.29 × 106J

41. Which of the following is a desirable property used for the filament of lamp?

A. Carbon

B. Neon

C. Argon

D. Hydrogen

42.The advantages of the thermoelectric thermometer include the following characteristics except that it can measure _____.

A. rapidly changing temperatures.

B. high and low temperatures.

C. temperature almost at a point

D. B and C

43. Which of the following is an effect of impurities on freezing and boiling points of liquids?

A. Increases freezing point and lowers the boiling point of liquids

B. Lowers freezing point and increases boiling point of liquids

C. Both freezing and boiling points of liquids are increased.

D. Lowers freezing and boiling point of liquids

44. On a fairly cool rainy day when the temperature is 20°C, the length of a steel railroad track is 20m. What will be its length on a hot dry day when the temperature is 40°C?

A. 20.004m

B. 20.002m

C. 20.013m

D. 20.009m

45. One of the most important applications of a bimetallic strip is found in the construction of _____.

A. a thermostat

B. an altimeter

C. a thermocouple

D. a hygrometer

46. If iron rails of 8m long are laid close up end to end when the temperate is 30°C, what gap will be provided between consecutive rails when the temperature rises to 60°C?

(Take linear expansivity of iron = 1.2 × 10-5/K).

A. 0.003m

B. 0.006m

C. 0.009m

D. 0.008m

47. Which of the options is not a material used to construct a mercury in glass thermometer?

A. A tube capillary of approximate length of 30cm

B. A trough or glass jar containing mercury

C. Bunsen burner

D. A bulb

48.The thermometer used for measuring the day and night temperature is the _____.

A. mercury in glass thermometer

B. clinical thermometer

C. maximum and minimum thermometer

D. alcohol in glass thermometer

49. How can the coefficient of linear thermal expansion of a solid be determined?

A. Ball and ring

B. Metal and gauche

C. Bimetallic strip

D. Thermistor

50. A metal rod 800m long is heated from 10°C to 85°C. If it expands by 1.36mm, the linear expansivity of the metal is _____.

A. 2.0 x 102K-1

B. 2.0 x 10-2K-1

C. 5.0 x 10-3K-1

D. 2.0 x 10-5K-1

51. Dry steam is passed into well-lagged copper calorimeter of mass 200g containing 300g of water and 30g of ice at 0°C. If the mixture is vigorously stirred until the temperature of the mixture is 30°C. Determine the mass of steam passed into the calorimeter.

(Specific heat capacitors of:

copper = 400J/kgK

water = 4200J/kgK.

specific latents heats of steam = 2.26 x 6J/kgK

ice = 336J/kgK).

A. 21.2g

B. 26.7g

C. 23.1g

D. 24.2g

52. Which of the following is a desirable property used for the filament of lamp?

A. Carbon

B. Neon

C. Argon

D. Hydrogen

53. The use of thermostat in a gas cooker is to _____.

A. put off the heat

B. regulate the temperature

C. decrease the temperature

D. increase the temperature

53. The use of thermostat in a gas cooker is to _____.

A. put off the heat

B. regulate the temperature

C. decrease the temperature

D. increase the temperature

54. If a certain thermometer scale indicates 105.6° and -25.0$_o$ as the upper and lower fixed points respectively. What would the scale read if the surrounding temperature at the time is 60°C?

A. 56.19°

B. 45.21°

C. 53.36°

D. 38.36°

55. Which of the following can be used to record accurate temperature value in research work?

A. Maximum and minimum thermometer

B. platinum resistance thermometer

C. Mercury-in-glass thermometer

D. Clinical thermometer

56. The instrument used to measure temperate is called _____.

A. barometer

B. ammeter

C. voltmeter

D. thermometer

57. The latent heat of fusion of a substance is the heat required to _____.

A. raise the temperature of a unit mass of the substance by 1°C

B. maintain unit mass of the substance at constant temperature

C. change unit mass of substance from solid to liquid at constant temperature.

D. change unit mass of liquid to vapour at constant temperature.

58. A copper cylinder is 6cm long and 3cm in diameter at 30°C. Find the area of one of its ends.

A. 28.274cm^2

B. 70.758cm^2

C. 70.686cm^2

D. 28.288cm^2

59. The maximum density of water is at _____.

A. -4°C

B. 4°C

C. 0°C

D. 100°C

60. In an electric kettle the heating element is usually located near the bottom of the kettle because _____

A. the conventionary current which are set up can carry heat to all parts of the water.

B. so that no heat can be lost to the surrounding.

C. so that it can boil faster and saturate the kettle.

D. none of the above.

ANSWERS

TOPIC: CURRENT ELECTRICITY

DIRECTION: Choose the correct answer from the lettered options.

1. Which of the following is an electrolyte?

A. Sugar solution

B. Alcohol

C. Paraffin

D. Grape juice

The correct answer is option [D].

2. An equipment whose power is 1500W and resistance 375 Ohms would draw a current of _____.

A. 0.01A

B. 2.00A

C. 4.00A

D. 77.50A

The correct answer is option [B].
Given; P = 1500W, R = 375Ω, I = ?
$P = I^2R$

$$\Rightarrow I = \sqrt{\frac{P}{R}} = \sqrt{\frac{1500}{375}} = \sqrt{4} = 2A$$

3. A voltmeter has a resistance of 4500Ω and is calibrated to read 2V per division. If the instrument is required to read 10V per scale division; what series resistance must be connected to it?

A. 18,000Ω.

B. 19,000Ω.

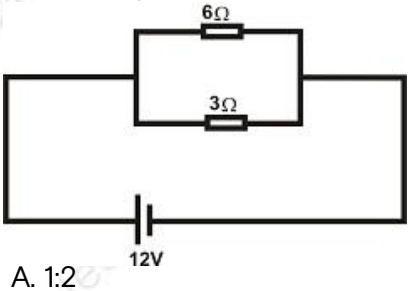
C. 20,000Ω.

D. 18,500Ω.

The correct answer is option [A].

Hint: 10V = P.d. across R + P.d. across galvanometer. 10 = 2/4500[R + 4500] → R = 18,000Ω.

4. In the diagram drawn, the ratio of the electric power dissipated in the 6Ω and 3Ω resistors repectively is _____.



A. 1:2

B. 1:3

C. 2:1

D. 2:3

The correct answer is option [A].

P = V2/R

The ratio power dissipated in the 6Ω and 3Ω resistors respectively are

(12)2/6 : (12)2/3

144/6 : 144/3

24 : 48

1 : 2

5. A wire of length 15m made of a material of resistivity 1.8×10−6Ωm has a resistance of 0.27W. Determine the area of the wire.

A. 1.5 × 10-4m^2

B. 1.0 × 10-4m^2

C. 2.7 × 10-5m^2

D. 7.3 × 10-6m^2

The correct answer is option [B].

The resistance of a wire is related of the resistivity r, the length l, and the area cross section by the formula

R = rl/A. Given r = 1.8 × 10-6, l = 15m, R = 0.27W, A = ?

A = rl/R = (1.8 × 10-6 × 15)/0.27 = 1.0 × 10-4m2

6. Which of the following is an essential property of the wire used for making fuses?

A. High thermal conductivity

B. Low melting point

C. Low electrical resistivity

D. Thick diameter

The correct answer is option [A].

7. The value of a resistivity wire is 1.1 x 10-6Ωcm and the resistance of the wire is 7.029 x 10-5Ω. Then the length of the wire is _____, if the wire has a diameter of 0.3mm.

A. 65cm

B. 40cm

C. 80cm

D. 64cm

The correct answer is option [D].

Hint: Use the equation R = [ρL]/A, where A = [πD2]/4.

8. The function of the system of granulated carbon mixed with manganese (IV) oxide in a Leclanche' cell is to _____.

A. increase the e.m.f of the cell to 2.0V

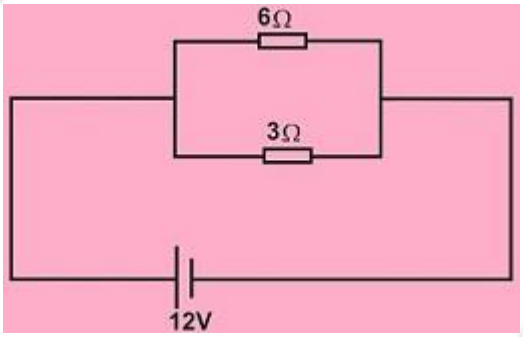
B. prevent local action in the cell

C. prevent polarization in the cell

D. make the cell black and hence a good radiator

The correct answer is option [C].

9. In the diagram drawn, the ratio of the electric power dissipated in the 6Ω and 3Ω resistors respectively is _____.



A. 1:2

B. 1:3

C. 2:1

D. 2:3

The correct answer is option [C]

10. Two resistors of resistances 100Ω and 200Ω are arranged in parallel and connected to 240V d.c source, the current in the circuit is _____.

A. 3.6A

B. 0.08A

C. 5A

D. 8A

The correct answer is option [A].

11. The point through which current enters and leaves an electrolytic substance is called _____.

A. terminals

B. escape point

C. electrodes

D. outlets

The correct answer is option [C].

12. Which of the following does not govern the resistivity of a material?

A. Current, I.

B. Resistance, R.

C. Area of material.

D. Length of material.

The correct answer is option [A].

Hint: Resistivity, ρ = RA/L, where R = resistance of wire, A = area of wire, L = length of wire.

13. A short chain is sometimes attached to the back of a petrol tanker to _____.

A. generate more friction

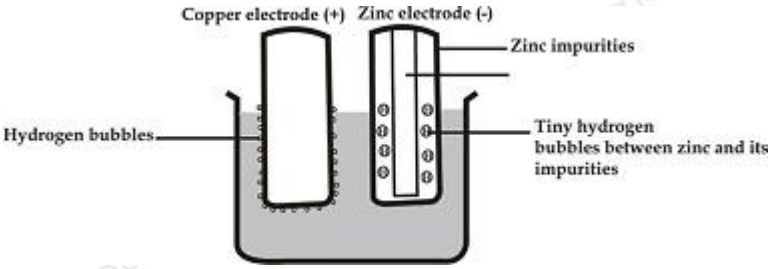
B. ensure the balancing of the tanker

C. caution the driver when over speeding

D. conduct excess charges to the earth

The correct answer is option [D].

14. What type of defect can be given to the diagram drawn?



A. Polarization

B. Local action

C. Lead acid accummation

D. Zinc action

The correct answer is option [B].

Use the information to answer the question.

15. The diagram shows resistors connected in _____.

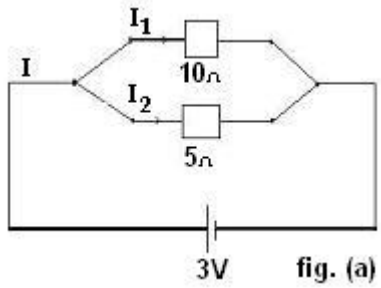


fig. (a)

A. series

B. parallel

C. non-parallel

D. all of the above

The correct answer is option [B].

16. A resistance of 5Ω is in series with one of 6Ω and a p.d. of 33V is applied across the whole arrangement. Find the current in each wire and the p.d. across each.

A. 3A, 15V, 14V.

B. 2A, 18V, 15V.

C. 3A, 15V, 18V.

D. 3A, 15V, 16V.

The correct answer is option [C].

Hint: 33V is the p.d. across both wires together.

The combined resistance = 5 + 6 = 11Ω.

Therefore, current I = V/R = 33/11 = 3A. Across the 5Ω wire alone V1 = IR1 = 3 x 5 = 15V. Across the 6Ω wire alone V2 = IR2 = 3 x 6 = 18V.

17. The only thing that cause motion is _____.

A. power

B. ability of the object to move

C. energy

D. force

The correct answer is option [D].

18. A cell of e.m.f 1.5V is connected in series with a resistor of resistance 3 Ohms. A high resistance voltmeter connected across the cell registers only 0.9V. Find the internal resistance of the cell.

A. 5.0Ω

B. 4.5Ω

C. 2.4Ω

D. 2.0Ω

The correct answer is option [D].
From Ohms law, current through the circuit I = V/R
$I = {}^{0.9}/_{3} = 0.3A$.
But E = V + Ir
where r = internal resistance, V = potential difference, and E = e.m.f of the cell

$$r = \frac{E - V}{I} = \frac{1.5 - 0.9}{0.3} = 2\Omega$$

19. The resistance in a wire material is 6Ω. A current of 2.0A flows through it for 5secs. The energy given out in the information, is in the form of _____.

A. light energy

B. heat energy

C. electrical energy

D. photo energy

The correct answer is option [B].

20. Which of the following instruments will accurately measure the e.m.f of a cell?

A. Ammeter

B. Avometer

C. Galvanometer

D. Potentiometer

The correct answer is option [D].

21. Two resistors R1 and R2 are connected in parallel. R2 is greater than R1. The combined resistance is _____.

A. less than R1

B. greater than R2

C. the sum of R1 and R2

D. the difference of R2 and R1

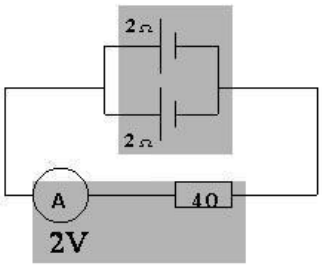
The correct answer is Option [A].

Recall that $R_{llel} = \frac{R_1 R_2}{(R_1 + R_2)}$

$R_1 R_2 > (R_1 + R_2)$

$\therefore Req < R_1$ **and** $Req < R_2$

22. The internal resistance of each of the cells in the figure drawn is 2 ohms. Calculate the total current in the circuit.



A. 0.8A

B. 0.56A

C. 0.40A

D. 0.004A

The correct answer is option [C].

The net resistance in the cells (parallel) $= \frac{2x2}{2+2} = 1\Omega$

$\Rightarrow$ The net resistance in the circuit = 4 + 1 = 5Ω

From Ohm's Law, V = IR $\therefore$ I = $^{V}/_{R}$ = $^{2}/_{5}$ = 0.4A

23. Find the effective resistance in the diagram drawn.

A. 6

B. 12

C. 18

D. 24

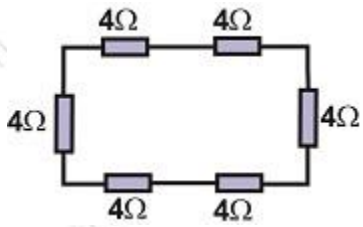
The correct answer is option [A].

The combine resistors of the 4 ohms which is in series is in parallel to each other = 4 + 4 = 8 ohms

parallel 1/R1 = 1/8 + 1/8 = 2/8

R1 = 4 ohms

The vertical resistors parallel to each other, the combine resistors R2



1/R2 = 1/4 + 1/4 = 2/4

R2 = 2 ohms

Therefore the effective resistance R = R1 + R2 = 4 + 2 = 6 ohms

24. The terminal p.d. of a battery is 15V when an external resistance of 25Ω is connected and 18V when an external resistance of 40Ω is connected. Find the internal resistance of the battery.

A. 25Ω.

B. 20Ω.

C. 35Ω.

D. 15Ω.

The correct answer is option [B].

Hint: I1 = V1/R1 = E1/[R1 + r], and I2 = V2/R2 = E2/[R2 + r],

where I1 = I2 = I, E1 = E2 = E, V1 = 15V, V2 = 18V, R1 = 25Ω, and R2 = 40Ω.

25. A wire is 250cm long, 0.50mm in diameter and has a resistance of 3.0Ω. Another wire of the same material is 400cm long and 0.80mm diameter. What is the total resistance of the two wires when they are connected in series?

A. 1.875Ω.

B. 4.875Ω.

C. 1.125Ω.

D. 3.875Ω.

The correct answer is option [B].

Hint: Using the equation R = [ρL]/A. R1 = [ρL1]/A1, and R2 = [ρL2]/A2,

where R1 = 3.0Ω, L1 = 250cm, A1 = [πD2]/4 and D = 0.50mm, R2 = ?,

L2 = 400cm, A2 = [πD2]/4 and D = 0.80mm.

Therefore, R = R1 + R2.

26. Which of the following material is a conductor?

A. Sodium

B. Glass

C. Plastic

D. Wax

The correct answer is option [A].

27. Which of the following factors does not affect the electric resistance of a wire?

A. Length

B. Mass

C. Temperature

D. Cross-sectional area

The correct answer is option [D].

Use the information to answer the question.

28. The voltage flowing across the circuit resistors is _____.

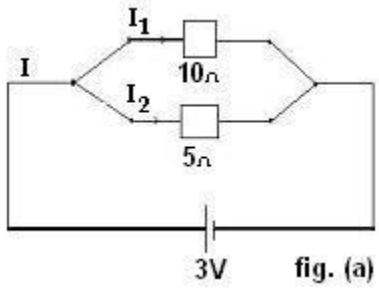


fig. (a)

A. parallel voltage

B. the same

C. different

D. series voltage

The correct answer is option [B].

Hint: The resistors are parallel thus they have the same voltage but different current.

29. The determining factors when a steady current flows through a varying wire material of uniform length and resistance include all EXCEPT _____.

A. electric field intensity

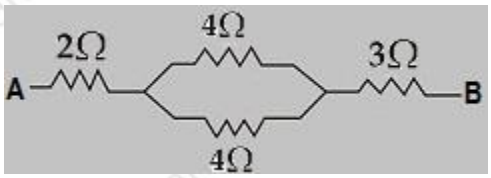
B. resistivity

C. current density

D. electric energy

The correct answer is option [D].

30. What is the resistance across AB?



A. 7.0 ohms

B. 11.0 ohms

C. 16.0 ohms

D. 8.0 ohms

The correct answer is option [A].

31. A cell whose internal resistance is 0.5

Ω delivers current of 4A to an resistor. The lost voltage of the cell is _____.

A. 0.125V

B. 1.250V

C. 2.000V

D. 8.000V

The correct answer is option [C].

Lost voltage = Ir = 4 x 0.5 = 2V

32. Two resistance R1 = 6Ω and R2 = 5Ω are connected in parallel over a p.d given that P1 and P2 represent the power dissipated in R1 and R2. Find the ratio P12:P22.

A. 5:6.

B. 6:5.

C. 30:25.

D. 25:30.

The correct answer is option [A].

Hint: Simply use the power P = IV to the compare the ratio.

33. A galvanometer of resistance 100Ω gives a full-scale deflection for current 10mA.I. If it is to be converted to read 1A, what will be the magnitude and arrangement of the resistor required?

A. 0.09-6Ω in parallel

B. 1.01Ω in parallel

C. 9.99Ω in parallel

D. 1.01Ω in series

The correct answer is option [A].

Hint:

The current through the shunt = (1 - 0.01) = 0.99A

Voltage across since the shunt is parallel to the meter = 0.01 × 100 V = 1V

Shunt resistance = 1/0.99Ω = 1.01 in parallel

34. In the wiring or earthing of houses, the fuse is connected to the wire coloured _____.

A. blue

B. brown

C. yellow

D. yellow and green

The correct answer is option [D].

35. Which of the following is stored by a dry leclanche' cell?

A. Cellular energy.

B. Chemical energy.

C. Electric energy.

D. Electrical energy.

The correct answer is option [D].

36. The e.m.f. of a coil is 6V and internal resistance 5Ω is connected across a resistor 2.5Ω. Find the current flowing in the circuit.

A. 2A.

B. 2.4A.

C. 3A.

D. 4A.

The correct answer is option [A].

Hint: I = E/[R + r], I = Current, E = e.m.f., R = Resistance and r = Internal Resistance.

37. Electric appliances in homes are normally earthed so that _____.

A. the appliances are maintained at a higher p.d than the earth.

B. the appliances are maintained at a lower p.d than the earth.

C. both the a.c and d.c sources can be used.

D. a person touching the appliances is safe from electric shock.

The correct answer is option [D].

38. When a ball rolls on a smooth level ground, the motion of its center is _____.

A. translational

B. oscillatory

C. random

D. rotational

The correct answer is option [A].

TOPIC: CURVILINEAR MOTION

DIRECTION: Choose the correct answer from the lettered options.

Use the information to answer the question.

1. The radius of an atom is 10-10m. If an electron of mass 9 x 10-31kg has an angular velocity of 8πrad/secs. What is the force acting on the electron?

A. $5.76p^2$ x 10-49N.

B. 5.76p x 10-49N.

C. 57.6 x 10-49N.

D. 57.6 x 10-50N.

The correct answer is option [A].

Hint: F = mω2r.

2. If a body of 0.5kg is whirled in a horizontal circle at the rate of 1000 revolution per minute. Determine the angular velocity.

A. 16.7 rad/s

B. 1.67 rad/s

C. 167 rad/s

D. 0.167 rad/s

The correct answer is option [A].

1000/60 = 16.67 rad/s ≈ 16.7 rad/s

3. If a body of 0.5kg is whirled in a horizontal circle at the rate of 1000 revolution per minute at constant speed and the radius of the horizontal circle described is 40cm, what is the tension in the string?

A. 58.5N

B. 55.8N

C. 3.34N

D. 334N

The correct answer is option [B].

Using the formula for Force/Tension = mv2/r or mrω2

[g = 10ms-2].

4. The length of a displaced pendulum bob, which passes its lowest point twice in every second, is _____.

A. 0.25m

B. 0.45m

C. 0.58m

D. 1.00m

The correct answer is option [A].
Since t = 1s, n = 1 hence T = 1, also g = 10ms^{-2}.
But $T = 2\pi\sqrt{l/g} \Rightarrow l = T^2 g/4\pi^2 \therefore l = \frac{1x10}{4\pi^2} = 0.253m$

5. The force that tends to influence the motion of a vibrating body to bring it to an equilibrium state as in a simple harmonic motion is termed _____.

A. equilibrium force

B. harmonic force

C. restoring force

D. hamiltonian force

The correct answer is option [C].

6. I. The motion of tyres of a moving car.

II. The motion of a loaded test tube oscillating vertically.

III. The beating of the heart.

IV. A stone tied to a spring and whirled around

V. The motion of the piston in a gasoline engine.

Which of the motions above is simple harmonic?

A. I, III, IV and V only

B. II, III and V only

C. II, III and IV only

D. I, II and V only

The correct answer is option [B].

7. An oscillating pendulum bob has a mass 0.1kg. Its amplitude is 0.01m and its period 2s, the constant ω in the acceleration formula is _____.

A. 31.42 rad/s

B. 0.3142 rad/s

C. 314.2 rad/s

D. 3.142 rad/s

The correct answer is option [D].

8. If a wheel 1.2m in diameter rotates at one revolution per second, calculate the velocity of the wheel.

A. 3.6ms-1

B. 3.8ms-1

C. 4.0ms-1

D. 7.5ms-1

The correct answer is option [B].

Diameter = 1.2m

The radius = D/2

Circumference of the wheel = 2πr = 2 x 22/7 x 0.6m

:.Velocity of the wheel = Circumference x time = 2 x 22/7 x 0.6 x 1 = 3.7699m/s = 3.8ms-1

9. Given that in a simple pendulum experiment, the length was constant all the way. What is the basic variable that was varied?

A. The vibrations.

B. The period.

C. The increasing or decreasing length.

D. The mass of the bob.

The correct answer is option [B].

10. A particle oscillating through a semi-circle has a radius of 2.0m and mass 0.3kg. Calculate the force acting on the particle if the frequency of oscillation is 7/22Hz.

A. 6N.

B. 2.4N.

C. 44N.

D. 1.2N.

The correct answer is option [B].

Hint: Force, F = mω2r. Where ω = 2pf. [p = 22/7].

11. The frequency of oscillation of a simple pendulum increases as the _____.

A. mass of the bob decreases

B. mass of the bob increases

C. length of the string decreases

D. none of the above

The correct answer is option [C].

12. An object travel round a circle twelve times in 18sec. If its speed is three meter per seconds and its angular velocity is 4.2 rad/s, the radius of the circle is _____.

[Time to go round the circle once = 18/12 sec].

A. 0.67m.

B. 0.71m.

C. 0.19m.

D. 1.23m.

The correct answer is option [B].

Hint: r = v/ω = 3/4.2 = 0.71m.

13. In oscillations, the coordinates of the center of mass of the object changes _____.

A. rotationally

B. randomly

C. cyclically

D. translationally

The correct answer is option [C].

14. A vertical string, suspended from a fixed point and a small mass attached to the free end is set into oscillations.

Which of the following statements about the system is correct?

I. The potential energy of the mass is a minimum at the middle of the swing

II. Its energy is at maximum at the middle of swing

III. The sum of the potential and kinetic energies is constant throughout the swing

A. I, II and III.

B. I and II only.

C. II and III only.

D. I and III only.

The correct answer is option [D]

15. The length of a simple pendulum is varied as different masses are hung on it. At a point the length from ceiling to floor was 100cm. What is the period of the pendulum?

A. $2p^2/g$.

B. $2p^2\sqrt{L/g}$.

C. $2p\sqrt{L/g}$.

D. $4p^2/g$.

The correct answer is option [C]. Hint: Period, $T = 2\pi\sqrt{[L/g]}$, since L = 100cm which is equivalent to 1m.

16. A one-naira coin rolling along the floor performs both _____.

A. translational and rectilinear motion

B. random and translational motion

C. oscillatory and rectilinear motion

D. translational and rotational motion

The correct answer is option [D].

17. A boy timed 20 oscillations of a pendulum thrice and obtained 46.3s, 48.0s and 45.0s. The mean period of oscillation is _____.

A. 46.430s

B. 46.300s

C. 2..400s

D. 2.312s

The correct answer is option [A].

18. A stone is whirled round a circular path of radius 15cm. If the stone makes 30 oscillations in 10seconds, calculate the angular speed of the stone. [π = 3.14].

A. 9.42 $rads^{-1}$

B. 12.56 $rads^{-1}$

C. 18.84 $rads^{-1}$

D. 62.80 $rads^{-1}$

The correct answer is option [C].

Hint:

$\omega = 2\pi/T$

19. A mass of 5g attached at the end of a spring was displaced vertically by 10cm, released and allowed to oscillate. Find the energy possessed by the 5g mass as it undergoes simple harmonic motion.

A. 2.5 × 10-3J

B. 2.5 × 10-4J

C. 2.5 × 10-2J

D. 2.5 × 10-5J

The correct answer is option [C].

Using the following formulas:

$T = 2\pi\sqrt{[L/g]}$

$\omega = 2\pi/T$

The energy = $mr\omega 2/2$

20. The equation given by time, $t = \sqrt{[2s/g]}$ where s= distance and g = gravitational acceleration shows that

A. time is mass independent.

B. time is a factor of mass.

C. time could be a constant.

D. only time can be valued fom the equation.

The correct answer is option [A].

21. In circular motion a force acting in a direction towards the centre of the circle is called _____.

A. contact force

B. non contact force

C. centripetal force

D. friction force

The correct answer is option [C].

22. Which of the following explains the movement of an object in a circular path?

i. Its velocity is constant

ii. It has constant acceleration directed away from the centre

iii. The centripetal force is directed towards the center.

iv. It has constant acceleration directed towards the centre.

A. I and III

B. I and IV

C. II and III

D. II and IV

The correct answer is option [B].

23. A piece of stone attached to one end of a string is whirled round in a horizontal circle and the string suddenly cuts. The stone will fly off in a direction _____.

A. parallel to the circular path

B. towards the centre of the circle

C. perpendicular to the circular path

D. tangential to the circular path

The correct answer is option [D].

24. A body of mass 40g is suspended from the end of a spiral spring whose force constant is 0.8N m-1. Find the period of motion.

A. 5.04s

B. 6.08s

C. 1.40s

D. 7.07s

The correct answer is option [C].

Hints: $T = 2\pi\sqrt{[e/g]}$

$F = ke$

25. The period, T of a vibrating particle with speed 2.0secs and wavelength, λ 0.5m is _____.

A. 4.0secs

B. 0.4secs

C. 0.25secs

D. 0.52secs

The correct answer is option [C].

Hint: $f = v/\lambda$ and $f = 1/T$.

26. A sealed tube of uniform cross-sectional area 3 x 10-4m^2, is loaded with lead shot so that, it can float upright in oil of density 700kg/m^2. If the total mass of the tube is 150g. Find the depth of immersion of tube in the coil.

A. 714.3m

B. 0.5m

C. 7m

D. 0.7m

The correct answer is option [D].

Using the formulas:

Volume = mass/density

depth of immersion = volume/cross-sectional area

27. An oscillating pendulum bob has a mass 0.1kg. Its amplitude is 0.01m and its period 2s. Find the maximum acceleration.

A. 0.099m/s^2

B. 0.99m/s^2

C. 9.9m/s^2

D. 0.03142m/s^2

The correct answer is option [A].

28. A simple pendulum has a length of 1.5m and a bob of mass 0.2 kg, the period of oscillation will be _____.

A. 2.4s

B. 0.24s

C. 24s

D. 0.024s

The correct answer is option [A].

Using the formula T = 2 × π × √ [L/g]

29 Calculate the velocity of a particle with acceleration 25m/s2 over a circle of radius 1m.

A. 3.2m/s.

B. 0.52m/s.

C. 4m/s.

D. 5.0m/s.

The correct answer is option [D].

Hint: Acceleration, a = v2/r then v = √ar. Where v = velocity, r = radius

30. Two simple pendulums X and Y oscillates at the same time. What is the period of pendulum Y which makes 500 vibrations in the time that X makes 400 vibration over a period of 1.5secs?

A. 1.2secs.

B. 1.875secs.

C. 1.9secs.

D. 2.0secs.

The correct answer is option [A].

Hint: f = 1/T, therefore, f1/f2 = T2/T1, where T1 = ?, T2 = 1.5secs, f1 = 500 oscillations, f2 = 400oscillations.

31. An object moves with uniform speed round a circle, its acceleration has _____.

A. constant magnitude and constant direction

B. constant magnitude and varying direction

C. varying magnitude but constant direction

D. varying magnitude and varying direction

The correct answer is option [B].

Since the speed is uniform, the acceleration will be constant but since it is a circle, its direction will change continuously.

32. If a graph of length, L and period T2 of a simple pendulum is plotted. From the information, the slope can be said _____.

A. to be a constant

B. to be a variable

C. to be a variation of length, L with period, T

D. all of the above

The correct answer is option [A].

33. Which of the following is NOT an example of forced vibration?

A. A loaded test tube oscillating vertically in a liquid

B. The vibrations of the diaphram of loud speaker

C. The vibrating body of a violin

D. A vibration turning fork pressed against a table top

The correct answer is option [A].

34. A simple pendulum has a period of 17.0s. When the length is shortened by 1.5m, its period is 8.5s. Then the original length of the pendulum is _____.

A. 1.5m

B. 2.0m

C. 3.0m

D. 4.0m

The correct answer is option [B].
Period T, acceleration due to gravity g, and the length of the wire l, are related by the equation:

$$T = 2\pi\sqrt{l/g} \Rightarrow g = \frac{4\pi^2 l}{T^2}$$

$T_1 = 17.0$, $L_1 = 1.5$, $T_2 = 8.5$, $L_2 = L - 1.5$ (since the length is shortened). Also g is constant ∴

$$\frac{4\pi^2 L}{17^2} = \frac{4\pi^2 (L - 1.5)}{8.5^2} \Rightarrow 72.25\,L = 289\,L - 433.5$$

$$\therefore L = 2m$$

TOPIC: DENSITY AND RELATIVE DENSITY

DIRECTION: Choose the correct answer from the lettered options.

1. The mass of a stone is 15g when completely immersed in water and 10g when completely in a liquid of relative density 2.0. What is the mass of the stone in air?

A. 25g.

B. 20g.

C. 30g.

D. 35g.

The correct answer is option [B].

Hint: Relative density = 2.0 = [n - 10]/[n - 15], where n = weight of stone in air.

2. If kerosene of density 0.8g/cm3 is mixed with water of 8g, what is the density of the resulting mixture?

[Take mass of kerosene = 32g]

A. 0.83g/cm^3.

B. 6.25g/cm^3.

C. 8.00g/cm^3.

D. 0.55g/cm^3.

The correct answer is option [A].

3. A heavy bucket of water is lowered down in a well. The upthrust experienced by the bucket of water is _____.

A. U = W + T

B. U = T - W

C. U = W - T

D. W = U - T

The correct answer is option [C].

Note: T = Tension, W = Weight and U = Upthrust.

4. If a solid X floats in liquid P of relative density 2.0 and in liquid Q of relative density 1.5. It can be inferred that _____.

A. weight of P displaced is greater than that of Q

B. weight of P displaced is less than that of Q

C. volume of P displaced is greater than that of Q

D. volume of P displaced is less than that of Q

The correct answer is option [D].

5. If kerosene of density 0.8g/cm3 is mixed with water of 8g, what is the density of the resulting mixture?

[Take mass of kerosene = 32g]

A. 0.83g/cm^3.

B. 6.25g/$cm^{3.}$

C. 8.00g/cm^3.

D. 0.55g/cm^3.

The correct answer is option [A].

6. The mass of a stone is 15g when completely immersed in water and 10g when completely in a liquid of relative density 2.0. What is the mass of the stone in air?

A. 25g.

B. 20g.

C. 30g.

D. 35g.

The correct answer is option [B].

Hint: Relative density = 2.0 = [n - 10]/[n - 15], where n = weight of stone in air.

7. The weight of a solid is measured in air and in a certain liquid of density 0.7g/cm3. If the weight of the solid in air and liquid are 0.09N and 0.02N. Determine the solid's volume.

A. 20cm^3.

B. 15cm^3.

C. 10cm^3.

D. 5cm^3.

The correct answer is option [C].

Hint: Volume, V = [mass of liquid displaced]/[density of liquid].

8. A heating coil rated 1000W is used to boil off completely 2kg of boiling water. The time required to boil off the water is _____.

[specific latent heat of vaporization of water = 2.3 x 106Jkg^{-1}].

A. 1.15 x 104s

B. 1.15 x 103s

C. 4.6 x 104s

D. 4.6 x 103s

The correct answer is option [D].

IVt = mcθ

1000 x t = 2 x 2.3 x 106Jkg-1

2 x 2.3 x 106/1000 = 4.6 x 103s

[Density of water = 1000Kgm-3, g = 10m^{-2}]

9. A cube of sides 0.2m hangs freely from a string. What is the upthrust on the cube when totally immersed in water?

A. 8000N

B. 800N

C. 110N

D. 80N

The correct answer is option [D].

Volume of cube = (0.2)3 = 0.008m3, it will displace water of its own

Volume = 0.008m3; weight of water displaced becomes

ρgV = 1000 x 10 x 0.008 = 80N

10. If kerosene of density 0.8g/cm3 is mixed with water of 8g, what is the density of the resulting mixture?

[Take mass of kerosene = 32g]

A. 0.83g/cm3.

B. 6.25g/cm3.

C. 8.00g/cm3.

D. 0.55g/cm3.

The correct answer is option [A].

[Density of water = 1000kgm−3, g = 10ms-2]

11. A cube of sides 0.1m hangs freely from a string. What is the upthrust on the cube when totally immersed in water?

A. 1000N

B. 700N

C. 110N

D. 10N

The correct answer is option [D]

Volume of cube = (0.1)3 = 0.001m3, it will displace water of its own

volume = 0.001m3; weight of water displaced becomes

W = rgV = 1000 x 10 x 0.001 = 10N

TOPIC: ELASTIC PROPERTIES OF SOLIDS

DIRECTION: Choose the correct answer from the lettered options.

1. True stress-strain curve need to be corrected after _____.

A. elastic limit

B. yield limit

C. tensile strength

D. no need to correct

The correct answer is option [C]

2. If a force of 50N stretches a wire from 20m to 20.01m, what is the amount of force required to stretch the same material from 20m to 20.05m?

A. 50N

B. 100N

C. 200N

D. 250N

The correct answer is option [D].

F1 = 50N, L1 = 20.1 - 20 = 0.01m

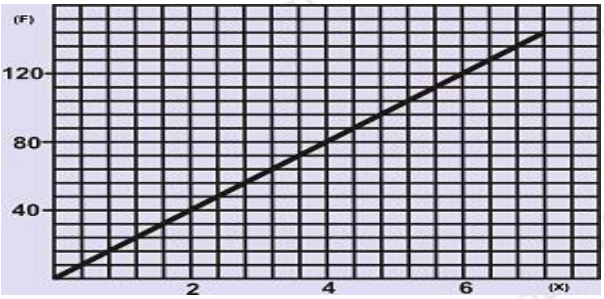
L2 = 20.05-20 = 0.05m

L1 /F1 = L2/F2

0.01/50 = 0.05/F2

F2 = 250N

3.The diagram drawn represents the graph of the force (F) applied in stretching a spiral spring against the corresponding extension (X). The force constant of the spring is _____.



B. 40Nm-1

C. 30Nm-1

D. 10Nm-1

The correct answer is option [A].

Using equation:

120 - 40/6 - 2 = 80/4 = 20Nm-1

4. A metal teapot X and a china teapot Y break when they fall on a concrete floor, then _____.

A. X and Y can each be put together again

B. X is broken because it is brittle

C. Y is broken because it is brittle

D. the metal of C has no dislocations.

The correct answer is option [C]

5.Hooke's law states that _____.

A. elastic range, strain is proportional to stress

B. plastic range, strain is proportional to stress

C. in both elastic and plastic range, strain is proportional to stress

D. none of the above

The correct answer is option [A]

6. Which of the following elements is a covalently bonded crystal?

A. Aluminium

B. Sodium chloride

C. Germanium

D. Lead

The correct answer is option [C]

7. A load of 20N on a wire of cross-sectional area 8 x 10-7m2 produces an extension of 10-4m, if the length is 3m, then the Young's Modulus for the material of the wire is _____.

A. 7.0 x 1011Nm-2

B. 7.5 x 1011Nm-2

C. 8.5 x 1011Nm-2

D. 9.0 x 1011Nm-2

The correct answer is option [B].
Given: F = 20N, A = 8 x $10^{-7}m^2$, e = 10^{-4}, l = 3m

$$E = \frac{Fl}{Ae} = \frac{20x3}{8x10^{-7}x10^{-4}} = 7.5x10^{11}Nm^{-2}$$

8. Malleability of a metal is _____.

A. the ability to withstand compressive stresses

B. the ability to withstand deformation under shear

C. the property by which a material can be cold-worked

D. the ability to undergo permanent deformation

The correct answer is option [C]

9. Annealing is generally done to impart _____.

A. hardness to the material

B. softness to the material

C. brittleness to the material

D. high conductivity to the material

The correct answer is option [B]

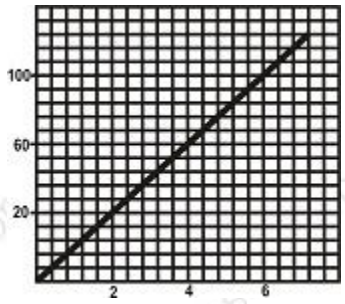
10. The diagram drawn represents the graph of the force (F) applied in stretch a spiral spring against the corresponding extension(x). The force constant of the spring is _____.

A. 17N m-1

B. 40N m-1

C. 30N m-1

D. 10N m-1



The correct answer is option [A].

F = ke

K = F/e

where F = focre, e = extension K = 100/6 = 17N m-1

11. A spring of force constant 500Nm-1 is compressed such that its length shortens by 5cm. The energy stored in the spring is _____.

A. 0.625J

B. 6.250J

C. 62.500J

D. 625.000J

The correct answer is option [A].

E = ke2/2, where k is force constant e = extension or compression

E = 1/2 x 500 x (5/100)2 = 1/2 x 500 x 25/1000 = 1/8 = 0.625J

12. Rubber and glass are widely used in industry. Which of the statements A to D is correct?

A. The stress-strain curves of the two materials are similar.

B. Glass has a definite melting-point.

C. Rubber has a low strain when initially stretched.

D. Glass has no dislocations.

The correct answer is option [D]

13.The preheating of parts to be welded and slow cooling of the welded structure will reduce _____.

A. cracking and incomplete fusion

B. cracking and residual stress

C. residual stress and incomplete penetration

D. cracking and underfill

The correct answer is option [C]

14.Which of the following is /are correct about crystals?

I. They are soluble

II. They have no definite melting point

III. They can be hydrous or anhydrous

IV. An example of these is glass.

A. I only

B. IV only

C. I and III only

D. I, II, III, and IV

The correct answer is option [C].

15. Change in elastic modulus for ordinary materials between OK and melting point is _____.

A. 10-20% increase

B. 10-20% decrease

C. 80-90% decrease

D. 80-90% increase

The correct answer is option [B]

16. If a material is subjected to two incremental true strains namely e1 and e2, then the total true strain is _____.

A. ε1 × ε2

B. ε1 - ε2

C. ε1 + ε2

D. ε1/ε2

The correct answer is option [C]

17. High elastic modulus in materials arises from _____.

A. high strength of bonds

B. weak bonds

C. combination of bonds

D. none of the above

The correct answer is option [A]

18. Plastic deformation results from which of the following?

A. Slip

B. Twinning

C. Both

D. None of the above

The correct answer is option [C]

19. The property of a material by which it can be drawn into wires is known as _____.

A. ductility

B. elasticity

C. softness

D. tempering

The correct answer is option [A]

20. _____ is the resistance to plastic deformation.

A. Toughness

B. Brittleness

C. Hardness

D. Malleability

The correct answer is option [C]

21.When very hot water is poured into identical thin and thick glass tumblers in equal volumes, the thick one cracks because _____.

A. glass is a good conductor of heat

B. glass is a crystal

C. of the uneven expansion of glass

D. of the even expansion of glass

The correct answer is option [C].

22. The correct order of the co-ordination number in simple cubic, body centered cubic and face centered cubic of unit cell is _____.

A. 6, 8, 12

B. 8, 12, 12

C. 12, 8, 12

D. 6, 8, 8

The correct answer is option [A]

23. A greased needle gently placed on water has an effect of _____.

A. causing the water temperature to rise

B. increasing the force of adhesion

C. increasing the surface tension of the water

D. reducing the density of the water

The correct answer is option [B].

24. Figure-out the odd point in the following.

A. Proportional limit

B. Elastic limit

C. Yield point

D. Fracture point

The correct answer is option [D]

25. _____ is the ability to resist crack growth.

A. Toughness

B. Malleability

C. Hardness

D. Ductility

The correct answer is option [A]

26.The correct order of the coordination number is SC (simple cubic), BCC (body centered cubic), FCC (face centered cubic) and HCP (hexagonal close packed) unit cells is _____.

A. 12, 8, 12, 6

B. 6, 8, 12, 12

C. 8, 6, 12, 12

D. 6, 12, 12, 8

The correct answer is option [B]

27. A spring of length 25cm is extended to 30cm by a load of 150N attached to one of its ends. What is the energy stored in the spring?

A. 3750J

B. 2500J

C. 3.75J

D. 2.50J

The correct answer is option [C].

Given; L1 = 25cm, L2 = 30cm, e = 30 − 25 = 5cm, F = 150N

But W = ½Ke2 and F = Ke (K = F/e)

=> W =½Fe = 0.5 x 150 x 5 x 10−2 = 3.75J

28.Which of the following is not the purpose of full annealing?

A. Refines grains

B. Induces softness

C. Removes strains and stresses

D. Produces hardest material

The correct answer is option [D]

29. How many neighbouring particules are there in a face-centred cubic crystal?

A. 2

B. 4

C. 6

D. 8

The correct answer is option [D].

30. Toughness of a material is equal to area under _____ part of the stress-strain curve.

A. elastic

B. plastic

C. both

D. none of the above

The correct answer is option [C]

31. Shape of true stress-strain curve for a material depends on _____.

A. strain

B. strain rate

C. temperature

D. all of the above

The correct answer is option [D]

32.Which of the following properties of a long steel bar would alter if the bar were melted, recast into a cube and allowed to cool to its original temperature?

A. Density

B. Volume

C. Specfic heat capacity

D. Electrical resistance

The correct answer is option [A].

33. The ability of an object to regain its original shape after an external force, which deformed it, has been removed is called _____.

A. dislocation

B. distortion

C. elasticity

D. restoration

The correct answer is option [C].

34. Time dependent permanent deformation is called _____.

A. plastic deformation

B. elastic deformation

C. creep

D. anelastic deformation

The correct answer is option [C]

35. When stretched beyond its elastic limit, a metal rod such as steel _____.

A. becomes plastic

B. becomes colder

C. obeys Hooke's law

D. has no energy

The correct answer is option [A]

36. The energy contained in a wire when it is extended by 0.02m by a force of 500N is _____.

A. 5J

B. 10J

C. 103J

D. 104J

The correct answer is option [A].

Given: extension e = 0.02m, F = 500N,

But Workdone = energy Therefore energy = ½Ke2 and k = F/e

=> W = ½Fe = 0.5 x 500 x 0.02

Therefore energy = 5J

TOPIC: FLUIDS AT REST AND IN MOTION

DIRECTION: Choose the correct answer from the lettered options.

1. The terminal velocity of a ball-bearing falling through a viscous fluid is reached when the _____.

A. upthrust is equal to the weight of the ball

B. ball accelerates uniformly

C. upthrust is equal to the velocity of the ball

D. velocity is uniform

The correct answer is option [A].

2. A seated flask contains 600cm3cm of air at 27°C and is heated to 35°C at constant pressure. The new volume is _____.

A. 508cm3

B. 516cm3

C. 608cm3

D. 616cm3

The correct answer is option [D].

V1 = 600cm3, T1 (27°C + 273K) = 300k, T2 = 35 + 273 = 300k V2 = ?

From the formular V1 /T1 = V2/T2

600 x 308/300 = 616cm-3

3. A mass of gas occupies 20m3 at 5°C and 760mm pressure. Determine its volume at 30°C and 800mm pressure.

A. 20.7m3

B. 2.07m3

C. 0.207m3

D. 114m3

The correct answer is option [A].

Using the formula: P1V1/T1 = P2V2/T2

4. What happens when a gas expands at constant temperature?

A. Its pressure decreases.

B. The total momentum of its molecules remains constant.

C. Its pressure decreases and the total momentum of its molecules remains constant.

D. Its pressure decreases and the total kinetic energy of its molecules decreases.

The correct answer is option [A].

When a gas expands at constant temperature, its pressure reduces.

5. Which of the following explains why an insect will float on water?

i. There is tension on the water surface

ii. Kerosene reduces the density of water so that the insect becomes denser than water.

iii. Kerosene reduces the surface tension of water.

A. i only

B. ii only

C. iii only

D. i and iii only

The correct answer is Option [D].

6. A body weighs 10N in air. When partially immersed in water, it displaces water of mass 0.3kg, the upthurst on the body is _____.

[g = 10m/s2].

A. 0.3N

B. 0.5N

C. 3.0N

D. 7.0N

The correct answer is option [C].

7.The stylus of a phonograph record exerts a force of 7.7 x 10−2N on a groove of radius 10−5m. Compute the pressure exerted by the stylus on the groove.

A. 4.90 x 108 Nm−2

B. 2.42 x 109 Nm−2

C. 3.45 x 108 Nm−2

D. 2.45 x 108 Nm−2

The correct answer is option [D].

$$pressure = \frac{force}{area}$$

given that force = 7.7 x 10^{-2}Nm
area of groove = πr^2

$$\therefore pressure = \frac{7.7\times10^{-2}}{\frac{22}{7}\times(10^{-5})^2} = 2.45\times10^{8}\,Nm^{-2}$$

8. A given mass of chlorine occupies 38cm3 at 20°C. Determine its final volume at 45°C, pressure remains constant.

A. 41.2cm3

B. 4.12cm3

C. 0.412cm3

D. 42cm3

The correct answer is option [A].

Using the formula:V2/T2 = V1/T1

9.When the volume of a given mass of gas is halved and its temperature doubled, the pressure _____.

A. remains constant

B. increases by a factor of 4

C. increases by a factor of 3

D. decreases by a factor of 4

The correct answer is Option [B].

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} = \frac{P_2(\frac{1}{2}V_1)}{2T_1}$$

$P_1 = \frac{1}{4}P_2$
$P_2 = 4P_1$
The pressure increases by a factor of 4.

10. A decrease in the temperature of a given volume of gas gives rise to a/an

I. decrease in kinetic energy of the molecules

II. increase in the mean speed of the molecules

III. increase in the momentum change during collision

IV. decrease in the number of collisions per second

Which of the statements above is /are correct?

A. I only.

B. II only.

C. II and III only.

D. I and IV only.

The correct answer is option [D].

11. A motor tyre is inflated to a pressure of 2×105Nm-2 when the temperature of air is 27°C. What will be the pressure in it at 87°C assuming that the volume of the tyre does not change?

A. 2.6 × 105Nm-2

B. 2.4 × 105Nm-2

C. 2.2 × 105Nm-2

D. 1.3 × 105Nm-2

The correct answer is option [B].

$P_1 = 2 \times 10^5 Nm^{-2}, T_1 = 27^oC = 300K, P_2 = ?, T_2 = 87^oC = 360K$

$$\frac{P_1}{T_1} = \frac{P_2}{T_2} \Rightarrow P_2 = \frac{P_1 T_2}{T_1} = \frac{2x10^5 x360}{300} = 2.4x\,10^5\,\mathrm{Nm}^{-2}$$

12. An empty density bottle weights 2N. If it weighs 5N when filled with water and 4N when filled with olive oil, the relative density of olive oil is _____.

A. 1 /3

B. 2 /3

C. 1/5

D. 2/5

The correct answer is option [B]

Relative density = weight of substance = 4-2 = 2/3

Weight of water 5-2

13. A body of mass 36kg falls through a viscous liquid which offers a drag force of 260N on the body. The upthrust on the body at terminal velocity is _____.

A. 50N

B. 100N

C. 310N

D. 620N

The correct answer is option [B].

W = mg = 36 x 10 = 360N

F = 260N At terminal velocity W - U = F

360 - U = 260N

F = 100N

14. Two liquids L1 and L2 are contained in a U-tube. The height and the density of L1 are 8cm and 103kg m-3 respectively. If the density of L2 is 800kg m-3, its height measured from the same level is _____.

A. 16cm

B. 12cm

C. 10cm

D. 8cm

The correct answer is option [C].

ρ = m/v

m = ρv = ρAh

mass of liquid L1 = mass of liquid = L2

(ρAh)liquid L1 = (ρAh)liquid L2

103 x A x 8 = 800 x A x h

8000 = 800h

h = 8000/800 = 10cm

15.The change in volume when 450kg of ice is completely melted is _____.

[density of ice = 900kg m-3, density of water = 1000kg m-3].

A. 4.50m3

B. 0.50m3

C. 0.45m3

D. 0.05m3

The correct answer is option [D].

ρ = m/v

vice = m/ρ = 450/900 = 0.5m3

vwater(change ice) = m/ρ = 450/1000 = 0.45m3

:.change in volume = 0.5 - 0.45 = 0.05m3

16. A flask weighs 50.26g when completely empty, and weights 50.94g when full of air at 35°C and 80cmHg. What is the density of the air at S.T.P if the capacity of the flask is 500cm3?

A. 0.84kg/m3

B. 1.45kg/m3

C. 0.95kg/m3

D. 0.68kg/m3

The correct answer is option [B].

Using the formulas:

P1V1/T1 = P2V2/T2

Density of air at s.t.p = mass of air/volume at s.t.p

17. A gas at 27°C is heated at constant pressure so that its volume is doubled. The new temperature is _____.

A. 5400K

B. 600K

C. 270K

D. 60°C

The correct answer is option [B].

Hint: V1/T1 = V2/T2

where V1 = Initial Volume, T1 = Initial Temperature, V2 = Final Volume, T2 = Final Temperature. V2 = 2V1, therefore V1/[27+273]K = 2V1/T2 → T2 = 2 x 300K = 600K

18.The pressure of 3moles of an ideal gas at a temperature of 27°C having a volume of 10-3m3 is _____.

[R = 8.3 Jmol-1K-1]

A. 2.49 x 105 Nm-2

B. 7.47 x 105 Nm-2

C. 2.49 x 106 Nm-2

D. 7.47 x 106 Nm-2

The correct answer is option [B].

PV = nRT

Where v = volume

n = number of moles

R = gas constant

T = temperature = 27 + 273 = 300°K

P = nRT/V = (3 x 8.3 x 300)/10-3 = 7.47 x 105 Nm-2

19. An ice cube floats in a glass of water filled to the brim. What happens when the ice melts?

A. The water level remains the same.

B. There is a drop in the level of water in the glass due to condensation on its outside.

C. The water in the glass overflows.

D. The level of water drops because melted ice occupies less volume.

The correct answer is option [A].

A floating body displaces an amount of liquid equal to its weight.

20.A mass of gas at a temperature of 157°C and pressure of 760mmHg is cooled to 27°C. Calculate its pressure if the volume remains constant.

A. 48mmHg

B. 131mmHg

C. 530mmHg

D. 570mmHg

The correct answer is option [C].

21. A hydraulic press has a large circular piston of radius 0.8m, and a circular plunger of radius 0.2m. A force of 500N is exerted by the plunger. Find the force exerted on the piston.

A. 8000N

B. 4000N

C. 2000N

D. 31N

The correct answer is option [A].

Radius of piston = 0.8m, radius of plunger = 0.2m.

Force on plunger = 500N

F2/F1 = A2/A1

F2 = 500 x 0.82/0.22 = 8000N.

22.Which of the options is not a precaution to be taken when verifying Boyle's law?

A. Difference in mercury column both arms must be taken when they are steady

B. The air must be dry

C. Ensure that the temperature does not vary

D. Making sure the tube is kept vertically

The correct answer is option [D].

23. A parachute attains a terminal velocity when _____.

A. its density is equal to the density of air

B. the viscous force of air and the upthrust completely counteracts its weight

C. it expands as a result of reduced external pressure

D. the viscous force of the air is equal to the sum of the weight and upthrust

The correct answer is option [B].

24. The pressure P, volume V and absolute temperature T of a given mass of an ideal gas changes simultaneously. Which of the following equation is correct about the gas?

A. PV = constant/T

B. P/T = constant

C. P/V = constant/T

D. I/T = constant/PV

The correct answer is option [D].

25. A copper disc X has a circular hole Y in it. When the disc is heated _____.

A. X and Y have the same area as before

B. the area of X and the area of Y both increase

C. the area of X decreases, the area of Y increases

D. the area of X increases, the area of Y decreases

The correct answer is option [B].

26. A plastic sphere floats in water with 50% of its volume submerged. If it floats in glycerine with 40% of its volume submerged, density of glycerine is _____.

[density of water = 1000kgm-3].

A. 1400kgm-3

B. 1250kgm-3

C. 500kgm-3

D. 1000kgm-3

The correct answer is option [B].

1000 : 50 = x : 40

water glycerine

By ratio = 1000/x = 40/50

x =

1000 x 500/40 = 1250kgm-3

27. The pressure of two moles of an ideal gas at temperature of 27°C and volume 10-2m3 is _____.

[R = 8.313Jmol-1K-1]

A. 4.99 x 10-5Nm-2

B. 9.80 x 10-5Nm-2

C. 4.98 x 10-5Nm-2

D. 9.80 x 10-5Nm-2

The correct answer is option [A].

PV = nRT

P = nRT/V = 2 x 8.313 x300/10-2 = 498780 = 4.99×10-5Nm-2

28.Before starting a journey, the tyre of a car was 3 x 105Nm-2 at 27°C. At the end of the journey, the pressure rose to 4 x 105Nm-2. Calculate the temperature of the tyre after the journey assuming that the volume is constant.

A. 400°C

B. 300 °C

C. 273 °C

D. 127 °C

The correct answer is option [D]

$P_1 = 3x10^5 Nm^{-2}$, $T_1 = 27°C = 300K$, $P_2 = 4x105 Nm^{-2}$, $T_2 = ?$

$P_1 / = P_2 / T_2 = P_2T_1 / P_1 = \frac{4 \times 10^5 \times 300}{3 \times 10^5} = 400$ K

But 400K = (400 - 273) °C = 127°C

TOPIC: HEAT

DIRECTION: Choose the correct answer from the lettered options.

1. The volume of a gas in a gas thermometer is 50cm^3 at 0°C. When the temperature is 100°C the volume of the gas is 85cm^3. What would be the temperature when the volume is 65cm^3?

A. 42.9°C

B. 233.3°C

C. 76.5°C

D. 58.8°C

The correct answer is option [A].

2. If the length of a cylindrical solid metal is Lcm at 30°C and the linear expansivity is α, what is the ratio of the new volume to the initial volume at 70°C?

A. 120α

B. 80α

C. 1 + 80α

D. 1 + 120α

The correct answer is option [D].

$V_2 = V_1[1 + 3 \times \alpha \times (70 - 30)]$

The ratio is $V_2/V_1 = 1 + 120\alpha$

3.Alcohol in glass thermometer has the advantage of _____.

A. higher expansivity than mercury in glass

B. not easily vaporizing than mercury

C. not wetting glass unlike mercury

D. greater conductivity than mercury

The correct answer is option [A].

4. What happens when a certain quantity of pure ice is completely changed to water at 0oC?

A. Latent heat is absorbed, the mass remains constant and the volume decreases.

B. Latent heat is given out, the mass is constant and the volume decreases.

C. Latent heat is given out, the mass increases and the volume remains constant.

D. Latent heat is absorbed, the mass decreases and the volume increases.

The correct answer is Option [A].

The specific latent heat of fusion of a substance can be defined as the quantity of heat required to change a unit mass of the substance from the solid state to the liquid state without a change in temperature. Hence for a block of ice to melt completely, latent heat is absorbed, the mass remains constant and the volume decrease.

5. Which of the following can be used to regulate temperature?

A. Fused metal

B. Bimetallic strip

C. Thermistor

D. Platinum strip

The correct answer is option [B].

6.A floating block floats on a warm water placed in a bucket till it completely melt. What will happen to the warm water?

A. Diluted and increase.

B. Its volume will increase and temperature also decrease.

C. Its temperature will decrease but its volume will remain the same.

D. Its volume will first decrease and then increase with reduced temperature.

The correct answer is option [C].

7.A bridge made of steel is 600m long. What is the daily variation in length if the night time and day time temperatures are 10oC and 35oC respectively?

The linear expansivity for steel is 0.000012 C-1

A. 0.18cm

B. 1.80cm

C. 18.0cm

D. 180cm

The correct answer is option [C].

8.

I. Reproducibility

II. Sensitivity

III. High accuracy

IV. High thermal capacity

Which of the options are qualities of a good thermometer?

A. II, III and IV only

B. I, II and III only

C. I, II and IV only

D. I, III and IV only

The correct answer is option [A].

9. _____ is the temperature of a mixture of pure ice and water at normal pressure.

A. Latent heat of fusion of ice

B. Latent heat of vaporization of ice

C. Ice maximum temperature

D. Lower fixed point of ice

The correct answer is option [D].

10. A temperature scale has a lower fixed point of 40mm and an upper fixed point of 200mm. What is the reading on this scale when the thermometer reads 60oC?

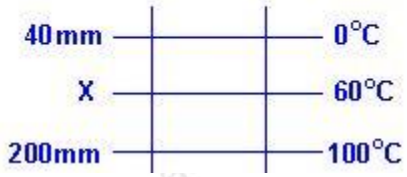
A. 33.3mm

B. 36.0mm

C. 96.0mm

D. 136.0mm

The correct answer is option [D].



$$\frac{100-0}{100-60}=\frac{200-40}{200-X}$$

X = 136mm

11. An iron rod is 450cm long at 0°C. It is mounted alongside a copper rod and both are always maintained at the same temperature. When they are heated to 100°C. It is found that the difference in their lengths is the same as it was at 0°C. Find the length of the copper rod at 0°C.

[Linear expansivity of iron = 1.09 x 10-5/K, and superficial expansivity of copper = 3.64-5/K]

A. 389.3cm.

B. 296.51cm.

C. 260.95cm.

D. 269.51cm.

The correct answer is option [D].
Hint: $\Delta l_c = \Delta l_i$,
where Δl_c = change in length of copper, and Δl_i = change in length of iron. Then, $\Delta l_c = l_c \alpha_c \theta$ and $\Delta l_i = l_i \alpha_i \theta$
where l_c = length of copper, and l_i = length of iron.
Also α_c= linear expansivity of copper, and α_i = linear expansivity of iron.

12.Calculate the heat required to change 0.45kg of water at 40°C to steam at 100°C.

(Take latent heat of vapourization of water = 2.26 x 106J/kg).

A. 1.13MJ

B. 11.3MJ

C. 113MJ

D. 1130MJ

The correct answer is option [A].

Using the equation:

$mc\theta + mL$

13.Evaporation is affected by all EXCEPT _____.

A. wind and air dryness

B. the liquid's nature

C. temperature

D. the freeness of the liquid

The correct answer is option [D].

14. The total capacity of a glass flask and its tube is $1000cm^3$, if it is filled with oil at 25°C and the temperature is later lowered to 20°C, find the change in liquid level in tube, if the cross sectional area of the tube is $1cm^2$.

(Coefficient of real expansion of oil = 5.4 x 10-4/K, coefficient of linear expansion of glass = 8.0 x 10-6/K).

A. 0.12cm

B. 2.70cm

C. 2.58cm

D. 2.85cm

The correct answer is option [C].

Using the formula to get the actual volume at 5oC which is the difference in temperature (25 - 20 = 5°)

$\gamma_r = \gamma_a - \gamma$

where γ_r = real expansivity, γ_a = apparent expansivity, γ = cubic expansivity

volume × apparent cubic expansivity of liquid × θ

Area = volume at 5°C/thickness

15.The melting point of a solid is given as 80°C. If 105J of heat is required that this temperature to melt 10g of the solid, the specific latent heat of fusion of the solid is _____.

A. $1.00 \times 10^3 JKg^{-1}$

B. $1.25 \times 10^5 JKg^{-1}$

C. $1.00 \times 10^7 JKg^{-1}$

D. $8.00 \times 10^{8} JKg^{-1}$

The correct answer is option [C].

Given that $Q = 10^{5}J$, $m = 10g$; $L_f = Q/m = 10^{5}/10 \times 10^{-3}$

$L_f = 1 \times 10^{7} Jkg^{-1}$

16. A mass of water, m, at 100°C is added to another mass of water, m1 at a temperature t. The resulting temperature of the mixture is T. If the specific heat capacity of water is 4.2J/g/k, derive an expression for t in terms of other quantities.

A. $t = T - {}^{m}(100 - T)/m_1$

B. $t = T + {}^{m}(100 - T)/m_1$

C. $t = {}^{m}(100 - T)/m_1 - T$

D. $t = {}^{m}(100 - T)/m_1 + T$

The correct answer is option [A].

$mc(100 - T) = m_1c(T - t)$

since the specific heat capacity of water is equal the equation becomes

$m(100 - T) = m_1(T - t)$

17. The density of iron at 30°C is 4.8g/cm^3. What is the density 80°C if the linear expansivity of iron is 1.2 x 10^{-5}/K?

A. 2.50g/cm^3

B. 3.80g/cm^3

C. 4.80g/cm^3

D. 4.79g/cm^3

The correct answer is option [D].

Using the formula $D_t = D_o/1 + \gamma_\theta$

where D_t = final density at θ_2, D_o = initial density at θ_1

18. Which of the following instrument is used for determining the upper fixed point of a thermometer?

A. Hypsometer

B. Voltmeter

C. Galvanometer

D. Calorimeter

The correct answer is option [A].

19.A substance melts at 78°C. Find the melting point of the same substance in kelvin.

A. 351K.

B. 213K.

C. 151K.

D. 203K.

The correct answer is option [A].

Hint: Kelvin temperature = 273°C + θ.

20. Which of these statements is true?

A. Apparent expansion is real expansion plus cubical expansion

B. Real expansion is apparent expansion plus cubical expansion

C. Cubical expansivity is real expansion plus apparent expansion

D. Real expansion is apparent expansion minus cubical expansion

The correct answer is option [B].

21.Find the conversion of 250°F to celcius scale.

A. 121.1°C

B. 105.2°C

C. 175.3°C

D. 145.1°C

The correct answer is option [A].

22. The advantage of the clinical thermometer over other thermometers is that it _____.

A. is very small

B. is very big

C. can be read at leisure

D. contains alcohol

The correct answer is option [C].

23. Which of the following is not a method of making a thermometer quick-acting and sensitive?

A. Reducing the bore of the tube so that substantial volume of liquid can quickly fill the tube

B. Ensure that the liquid used must be one of high conductivity so that it can respond quickly to heat effect

C. Reducing the size of the bulb so as to contain large volume of liquid

D. Ensure that the thickness of the glass is thin

The correct answer is option [C].

24. A metal X and a metal Y both lose the same quantity of heat when their temperature falls from 16oC to 10oC. The specific heat capacity of X is twice that of Y. Then the ratio mass of X/mass of Y is _____.

A. 3/2

B. 2/1

C. 1/ 2

D. 1/3

25 A beaker containing 605g of water at 35°C is heated uniformly until the water boils after 180s and gives off steam afterwards. With the heat source removed, ice at 0°C is added to the remaining 600g of the boiling water to bring its temperature to 0°C. Find the mass of the ice added.

(Specific heat capacity of water = $4.2 \times 10^{3} Jkg^{-1}K^{-1}$

Specific latent heat of steam = $2.2 \times 10^{6} Jkg^{-1}$

Specific latent heat of ice = $3.2 \times 10^{5} Jkg^{-1}$)

A. 354g

B. 489g

C. 189g

D. 276g

The correct answer is option [D].

$^{m}hot^{c\theta} = {}^{m}cold^{L}$

26. A platinum resistance thermometer wire has a resistance of 5ohms at 0°C and 5.5ohms at 100 C. Calculate the temperature of the wire when the resistance is 5.2ohms.

A. 80°C

B. 60°C

C. 40°C

D. 10°C

26. A platinum resistance thermometer wire has a resistance of 5°hms at 0°C and 5.5°hms at 100°C. Calculate the temperature of the wire when the resistance is 5.2°hms.

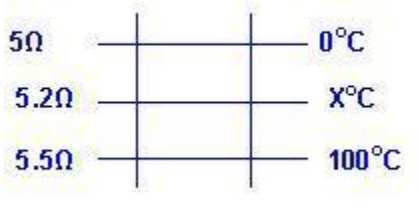
A. 80°C

B. 60°C

C. 40°C

D. 10°C

The correct answer is option [C].



$$\frac{5.5-5.2}{5.5-5}=\frac{100-X}{100}$$

$30 = 50 - 0.5X$

$\Rightarrow X = 40°C$

27. 106J of heat is required to boil off completely 2kg of a certain liquid. Neglecting heat lost to surroundings, the latent heat of vaporization of the liquid is _____.

A. 5.0 x 106J kg^{-1}

B. 2.0 x 106J kg^{-1}

C. 5.0 x 105J kg^{-1}

D. 2.0 x 106J kg^{-1}

The correct answer is option [C].

Q = mL => 106 =2 x L

L = 106/2 = 0.5 x 106

L = 5 x 105J kg^{-1}

28. A copper calorimeter of mass 0.10kg contains 0.090kg of water at 10.0°C. When 0.010kg of ice at 0°C is added and allowed to melt, the temperature falls to 2.0°C. Calculate a value for the specfic latent heat of fusion of ice. If the specific heat capacity of copper calorimeter = 400J/kgK and specific heat capacity of water = 4200J/kgK.

A. 3.26KJ/kg

B. 32.6KJ/kg

C. 326KJ/kg

D. 3260KJ/kg

The correct answer is option [C].

Using the equation:

[mccc + mhwcw] × θ10oC = [(mhw + mw)cw + mccc]θ2oC + mwL

29. Which of the following is not a property for thermometric liquid?

A. It must have a low density

B. It must have a low specific heat capacity

C. It must have low boiling point and high melting point so that both temperatures can be measured

D. it must have high coefficent of expansion

The correct answer is option [C].

30. Which of the following is an advantage of thermoelectric thermometer?

A. They can give precise temperature values

B. It cannot be used to measure in small enclosures due to its bulky size

C. It can be used for taking high temperature values

D. It is very sensitive and gives an accurate measurement

The correct answer is option [D].

31. The thermometric property of a thermocouple is the change in _____.

A. equivalent resistance

B. electromotive force

C. colour

D. pressure

The correct answer is option [B].

32. A quantity of water at 0oC is heated to about 30°C. At each degree rise in temperature, its density will _____.

A. rise steadily

B. rise then fall

C. fall steadily

D. fall then rise

The correct answer is option [B].

33. The phenomenon which occurs when liquid molecules change to vapour state at a particular temperature is called _____.

A. melting point

B. boiling point

C. evaporation

D. freezing point

The correct answer is option [C].

34. A square plate of side 15cm is made of a metal of linear expansivity 2.0 x 10-5/K, if the thickness of the plate is 5mm and the plate is heated from 25°C to 80°C. What is the cubical increase?

A. 0.12cm^3

B. 0.25cm^3

C. 0.37cm^3

D. 0.74cm^3

The correct answer is option [C].

Using the equation $V2 = V1[1 + 3 \times \alpha \times (\theta 2 - \theta 1)]$

35. The Hope's apparatus used to verify anomalous expansion of water gives satisfactory result _____.

A. when the experiment is carried out at 30°C

B. when the apparatus is placed on type of support

C. when the experiment is carried out in a cold room

D. when the Hope's vessel is made of steel

The correct answer is option [C].

36. A liquid -in- glass can be made sensitive if the _____.

A. size of bulb is increased

B. bore of the tube is increased

C. thickness of the glass is increased

D. liquid used is one of low-conducting

The correct answer is option [A].

37. The cubic expansivity of a liquid occurs in _____.

A. an in expansible vessel

B. an expansible vessel

C. a rigid vessel

D. none of the above

The correct answer is option [B].

38. An iron cube has each edge 15cm long at 20°C. What will be the new surface area of a face when the temperature rises to 80°C?

A. 157.3cm^2

B. 467.8cm^2

C. 225.3cm^2

D. 337.5cm^2

The correct answer is option [C].

39.Which of the following liquids is most suitable for making a maximum thermometer?

A. Glycerine.

B. Water.

C. Mercury.

D. Alcohol.

The correct answer is option [C].

40. An electric kettle contains 500cm^3 of water at 25°C. Determine the heat required to bring the water to boiling.

(Latent heat of vaporisation of water = 2.26 × 106J/kg).

A. 1.58 × 105J

B. 2.05 × 105J

C. 1.29 × 105J

D. 1.29 × 106J

The correct answer is option [D].

mL + mcθ

41. Which of the following is a desirable property used for the filament of lamp?

A. Carbon

B. Neon

C. Argon

D. Hydrogen

The correct answer is option [C].

42.The advantages of the thermoelectric thermometer include the following characteristics except that it can measure _____.

A. rapidly changing temperatures.

B. high and low temperatures.

C. temperature almost at a point

D. B and C

The correct answer is option [C]

43.Which of the following is an effect of impurities on freezing and boiling points of liquids?

A. Increases freezing point and lowers the boiling point of liquids

B. Lowers freezing point and increases boiling point of liquids

C. Both freezing and boiling points of liquids are increased.

D. Lowers freezing and boiling point of liquids

The correct answer is option [B].

[coefficient of linear expansion of steel = 11 x 10−6 K−1]

44. On a fairly cool rainy day when the temperature is 20oC, the length of a steel railroad track is 20m. What will be its length on a hot dry day when the temperature is 40oC?

A. 20.004m

B. 20.002m

C. 20.013m

D. 20.009m

45. One of the most important applications of a bimetallic strip is found in the construction of _____.

A. a thermostat

B. an altimeter

C. a thermocouple

D. a hygrometer

The correct answer is option [A].

One of the most important applications of a bimetallic strip is found in the construction of a thermostat.

46. If iron rails of 8m long are laid close up end to end when the temperate is 30°C, what gap will be provided between consecutive rails when the temperature rises to 60°C?

(Take linear expansivity of iron = 1.2 × 10-5/K).

A. 0.003m

B. 0.006m

C. 0.009m

D. 0.008m

The correct answer is option [A].

47. Which of the options is not a material used to construct a mercury in glass thermometer?

A. A tube capillary of approximate length of 30cm

B. A trough or glass jar containing mercury

C. Bunsen burner

D. A bulb

The correct answer is option [D].

48.The thermometer used for measuring the day and night temperature is the _____.

A. mercury in glass thermometer

B. clinical thermometer

C. maximum and minimum thermometer

D. alcohol in glass thermometer

The correct answer is option [C].

49. How can the coefficient of linear thermal expansion of a solid be determined?

A. Ball and ring

B. Metal and gauche

C. Bimetallic strip

D. Thermistor

The correct answer is option [C].

50.A metal rod 800m long is heated from 10°C to 85°C. If it expands by 1.36mm, the linear expansivity of the metal is _____.

A. 2.0 x 102K-1

B. 2.0 x 10-2K-1

C. 5.0 x 10-3K-1

D. 2.0 x 10-5K-1

51. Dry steam is passed into well-lagged copper calorimeter of mass 200g containing 300g of water and 30g of ice at 0°C. If the mixture is vigorously stirred until the temperature of the mixture is 30°C. Determine the mass of steam passed into the calorimeter.

(specific heat capacitors of:

copper = 400J/kgK

water = 4200J/kgK.

specific latents heats of steam = 2.26 x 6J/kgK

ice = 336J/kgK).

A. 21.2g

B. 26.7g

C. 23.1g

D. 24.2g

The correct answer is option [A].

Using the equation:

mcccθ + (mw + mi)cwθ1 + miL = msL + mscwθ2

where θ1 = (30 - 0)°C

θ2 = (100 - 30)°C

52.Which of the following is a desirable property used for the filament of lamp?

A. Carbon

B. Neon

C. Argon

D. Hydrogen

The correct answer is option [C].

53.The use of thermostat in a gas cooker is to _____.

A. put off the heat

B. regulate the temperature

C. decrease the temperature

D. increase the temperature

The correct answer is option [B].

53.The use of thermostat in a gas cooker is to _____.

A. put off the heat

B. regulate the temperature

C. decrease the temperature

D. increase the temperature

The correct answer is option [B].

54. If a certain thermometer scale indicates 105.6° and -25.0° as the upper and lower fixed points respectively. What would the scale read if the surrounding temperature at the time is 60°C?

A. 56.19°

B. 45.21°

C. 53.36°

D. 38.36°

The correct answer is option [C].

55. Which of the following can be used to record accurate temperature value in research work?

A. Maximum and minimum thermometer

B. platinum resistance thermometer

C. Mercury-in-glass thermometer

D. Clinical thermometer

The correct answer is option [B].

56. The instrument used to measure temperate is called _____.

A. barometer

B. ammeter

C. voltmeter

D. thermometer

The correct answer is option [D].

57.The latent heat of fusion of a substance is the heat required to _____.

A. raise the temperature of a unit mass of the substance by $1^{o}C$

B. maintain unit mass of the substance at constant temperature

C. change unit mass of substance from solid to liquid at constant temperature.

D. change unit mass of liquid to vapour at constant temperature.

The correct answer is option [C].

58.A copper cylinder is 6cm long and 3cm in diameter at $30^{o}C$. Find the area of one of its ends.

A. $28.274cm^2$

B. $70.758cm^2$

C. $70.686cm^2$

D. $28.288cm^2$

The correct answer is option [B].

Using the equation

$A2 = A1[1 + 2 \times \alpha \times (\theta 2 - \theta 1)]$

59.The maximum density of water is at _____.

A. -4°C

B. 4°C

C. 0°C

D. 100°C

The correct answer is option [B].

60.In an electric kettle the heating element is usually located near the bottom of the kettle because _____

A. the conventionary current which are set up can carry heat to all parts of the water.

B. so that no heat can be lost to the surrounding.

C. so that it can boil faster and saturate the kettle.

D. none of the above.

The correct answer is option [A].