STD-8

PHYSICS QUESTION BANK

FIRST TERMINAL PORTION

Chapter-1 MATTER

EXERCISE 1.1

1) Define the terms: (a) Element (b) Atom (c) Molecule

A. **Element –** It is a substance which cannot be further divided into two or more simpler substances.

Atom –The smallest unit of element which may or may not have an independent existence but always takes part in a chemical reaction is called an atom.

Molecule –The smallest unit of a matter which has an independent existence and possesses complete physical and chemical properties of the matter is called molecule.

2) State five important assumptions of kinetic theory of matter.

A. The important assumptions of kinetic theory of matter are as follows:

1. The molecules in a matter are in a state of continuous motion, which does not stop over any length of time.

2. It is on account of this eternal continuous motion, that molecules possess kinetic energy. The kinetic energy of the molecules increases with the increase in temperature and vice-versa.

3. The molecules always attract each other with a force called intermolecular force of attraction. The force of attraction between similar kinds of molecules is called force of cohesion, whereas the force of attraction between different kinds of molecules is called force of adhesion.

4. There exists empty space between the molecules which is called intermolecular space.

5. The intermolecular force of attraction increases if the intermolecular space between the molecular decreases and vice-versa.

3) Explain on the basis of kinetic theory of matter

(a)Solids have a definite volume and definite shape.

A. In solids, the intermolecular force of attraction is the strongest. This strong intermolecular force of attraction holds the molecules tightly at their places. So because of the fixed positions of molecules, solids have definite volume and definite shape.

(b)Liquids have definite volume and no definite shape.

A. In liquids, the molecules are less tightly packed. Intermolecular spaces are large and inter molecular force of attraction is less. So the molecules do not stay at one place but they interchange their positions. So liquids have no definite shape. But as the number of molecules in a given liquid remains same, they have definite volume.

(c)Gases have no definite volume and no definite shape.

A. In gases, the molecules are so much far apart, that intermolecular force of attraction is negligible. So the molecules of a gas are capable of moving independently in the space provided. Hence gases have neither definite volume nor definite shape.

4) (a) What do you understand by the term surface tension?

A. The phenomenon due to which the exposed surface of a liquid contained in vessel behaves like a stretched rubber membrane is called surface tension.

(b)Name the force responsible for surface tension in liquids.

A. The unbalanced cohesive force acting near the top surface of a liquid is responsible for surface tension in liquids.

5**) Explain the following:**

(a)A very small amount of mercury on placing over a clean glass plate forms a tiny spherical ball.

A. The force of attraction between the molecules of mercury (cohesive force) is more than the force of attraction between the molecules of mercury and glass (adhesive force). So when a small amount of mercury is placed on a glass plate, the molecules of mercury get attracted to each other strongly but not towards the surface of glass. So the mercury molecules sticking to each other form a tiny spherical ball.

(b)A very small amount of water on placing over a clean glass plate forms an oval shaped drop.

A. The force of attraction between the molecules of water (cohesive force) is lesser than the force of attraction between the molecules of water and glass (adhesive force). So when a small amount of water is placed on a glass plate, the molecules of water get attracted more towards the surface of glass rather than to each other. So the shape of water drop tends to elongate and it looks as an oval shaped drop.

6)(a)What do you understand by the term meniscus?

A. The formation of curved surface by the exposed surface of a liquid contained in a narrow vessel is called as meniscus.

(b)Name the kind of meniscus formed (i) in case of water (ii) in case of mercury.

A. (i) Concave meniscus is formed in case of water.

(ii)Convex meniscus is formed in case of mercury.

7) On the basis of kinetic model, explain how the liquids exert pressure.

A. The molecules of a liquid in a vessel are not stationary but are always in state of random motion in all possible direction. In doing so, the molecules of liquid strike against the walls of the containing vessel. Hence they exert some specific force on the walls of the containing vessel. This force exerted per unit area on the walls of containing vessel is the cause of liquid pressure.

8) On the basis of kinetic model, explain how the gases exert pressure.

A. The molecules of a gas in a closed vessel are not stationary but are always in state of random motion in all possible direction. In doing so, the molecules of gas strike against the walls of the containing vessel. Hence they exert some specific force on the walls of the

containing vessel. This force exerted per unit area on the walls of containing vessel is the cause of gas pressure.

9) Explain the heating of iron rod by conduction on the basis of kinetic model.

A. When an iron rod is heated from one end, its atoms gain heat energy at that end. This gain in heat energy increases the kinetic energy of the atoms. So the atoms vibrate more vigorously about their mean positions. So they strik

the neighbouring atoms and transfer a part of kinetic energy to them. In this way more and more atoms along the length of the rod gain kinetic energy and hence the temperature of the rod rises. Thus the iron rod is heated by conduction without actual movement of the atoms.

10)Liquids and gases get heated by convection. Explain the convection on the basis of kinetic model.

A. Fluids i.e. both liquids and gases are heated by method of convection. When a fluid in a vessel is heated, its molecules near the source of heat absorb heat. So the kinetic energy of these molecules increases, and they move more vigorously. As the molecules of a fluid are free to move, they move away from the source of heat and rise upward. This results in fall in pressure. To equalize the pressure, the molecules from colder regions sink down and move towards the source of heat. This gives rise to a convection current to set up in the fluid. Thus the whole volume of the fluid gets heated by convection process.

ADDITIONAL QUESTIONS

1) Differentiate between solids, liquids and gases on the basis of kinetic theory.

A.

Solids	Liquids	Gases
The molecules of a solid are very tightly packed.	The molecules of a liquid are loosely packed.	The molecules of a gas are far separated from each other.
The intermolecular spacing is the least in solids.	The intermolecular spacing in liquids is more than that in solids but less than that in gases.	The intermolecular spacing is the maximum in gases.
	The intermolecular force in	

The intermolecular force is the strongest in solids. Molecules of a solid possess vibratory motion of very small amplitude.	liquids is stronger than that in gases but weaker than that in solids. Molecules of a liquid possess random motion within the boundary of the liquid.	The intermolecular force is the weakest in gases. Molecules of a gas possess random motion in the whole volume of the containing vessel.

2) Differentiate between cohesive force and adhesive force with examples.

A. The force of attraction between the similar kinds of molecules is called cohesive force. For example, in a drop of mercury, the molecules of mercury remain sticking to each other by means of cohesive force. Similarly in a piece of iron, the molecules of iron stick to each other by cohesive force.

In the other hand the force of attraction between molecules of different kinds is called adhesive force. For example, the force of attraction between paper and glue, force of attraction between paper and ink, force of attraction between cement and brick etc.

3) Give reasons for the following:

(a) Mercury has a convex meniscus in a narrow glass tube.

A. The molecules of mercury have strong force of cohesion but no force of adhesion with glass. So when some mercury is taken in a glass tube, the molecules of mercury near the top surface are pulled inward due to unbalanced cohesive forces. Thus in order to

neutralize these forces, the molecules of mercury near the top surface realigns themselves and hence takes convex shape. This is the reason why mercury has convex meniscus in a glass tube.

(b) Water has concave meniscus in a narrow glass tube.

A. The molecules of water have a stronger force of adhesion with glass surface and a weak force of cohesion amongst themselves. So if some water is taken in a glass tube then the molecules of water on the top surface are pulled strongly towards glass and tend to rise up along the glass surface. This in turn creates a depression in the middle of the water surface for which the meniscus becomes concave in shape.

4) How the volume and pressure of an enclosed gas are related to each other?

A. The pressure and volume of an enclosed gas are inversely proportional to each other. That means if the volume of the enclosed gas decreases then its pressure increases and vice-versa.

5)Define: conduction and convection.

Conduction –The mode of transmission of heat energy from one atom to another atom, in the direction of lower temperature without the actual movement of atoms from their mean position is called conduction.

Convection –The phenomenon, due to which particles of a medium actually move towards the source of heat energy, and then on absorbing heat energy move away from it, thereby making a space for other particles of medium to move towards the source of heat, is called convection.

6)What is a change of state?

A The process by which a substance changes from one physical state to another with the absorption or release of heat energy is called as change of state.

7) What is latent heat? Why it is named so?

A. The amount of heat absorbed or given out by whole mass of a substance when the substance undergoes a change of state at some fixed temperature is known as latent heat.

Heat is invisible. When any substance absorbs or releases heat then it is externally known in terms of change in temperature of that substance. However during the change of state of any substance, the heat is absorbed or released without any change of temperature of the substance. So this heat is considered to be hidden in the substance. Hence the name hidden heat or latent heat.

8)Define: Latent heat of fusion and Latest heat of vaporization

Latent heat of fusion-Amount of heat energy supplied to a solid at its melting point such that it changes into liquid without any rise in temperature.

Latent heat of vaporization-The amount of heat energy supplied to a liquid at its boiling point such that it changes into gaseous state without any rise in temperature.

9)Write one difference between *gas and vapor.*

Gas –Gas is a state of liquid at or above the boiling point of the liquid.

Vapour –Vapour is the gaseous state of the liquid below the boiling point.

EXERCISE 1.2

1) Define the following:

(a)Specific latent heat of fusion:

It is the amount of heat energy supplied to 1kg of a solid at its melting point such that the solid changes into liquid without any rise in temperature.

(b)Specific latent heat of vaporization:

It is the amount of heat energy supplied to 1kg of a liquid at its boiling point such that the liquid changes into vapor without any rise in temperature.

2) Define the following and state their numerical value in SI system

A.(a)**Specific latent heat of fusion of ice-**

It is the amount of heat energy required to change. 1kg of ice at 0° to water at 0°.Its numerical value is 336000J kg^{-1}.

(b)Specific latent heat of vaporization of steam

It is the amount of heat energy required to change 1kg of water at 100°C to steam at 100°C. Its numerical value is 2260 $x10^3$ J kg^{-1}.

3) (a)During change of state temperature does not rise or fall. What happens to the heat energy supplied or given out? Explain.

A. Whenever there is a change of state, heat is either supplied or given out but there is no rise or fall in temperature of the substance. This is because the heat supplied is used up in increasing the intermolecular separation by overcoming cohesive force between molecules whereas heat given out is used in decreasing the intermolecular separation.

(b)Explain the change of state from solid to liquid on the basis of kinetic theory.

A. When a solid is heated, its molecules absorb heat energy and hence the kinetic energy of molecules increases. Due to this increased kinetic energy, the molecules start vibrating about their mean position with a greater amplitude. This in turn increases the intermolecular spaces and weakens the intermolecular forces. This continues till a stage is reached when the kinetic energy of the molecules becomes more than the intermolecular forces. At this stage the molecules start interchanging their positions and hence the solid changes to the liquid state.

4) Define the following

(a)Fusion: The process due to which a solid change into liquid state at some fixed temperature by absorption of heat energy is known as melting or fusion.

(b)Fusion point: The fixed temperature at which a solid changes into liquid state is called fusion point.

(c)Solidification: The process due to which a liquid changes into solid state at some fixed temperature by release of heat energy is known as freezing or Solidification.

(d)Solidification point: It is the fixed temperature at which liquid changes into solid state.

(e)Vaporization: The process due to which liquid changes into gaseous state at some fixed temperature by absorption of heat energy is known as boiling or Vaporization.

(f)Boiling point: It is the fixed temperature at which liquid changes into gaseous state

(g)Liquefaction: The process due to which a gas changes into liquid state at some fixed temperature by release of heat energy is known as Liquefaction or condensation.

(h)Liquefaction point: It is the fixed temperature at which a gas changes into liquid state.

(i)Deposition: The process in which a gas directly transforms into a solid is called Deposition.

5)Explain the following:

(a)Why do soft drink bottles cools better in ice at 0^0C than water at 0^0C?

A. The specific latent heat of fusion of ice is very high. So ice can extract a larger quantity of heat than cold water at 0^0C from a soft drink. So ice can cool soft drink bottles better than water at 0^0C.

(b)Why the weather becomes bitterly cold when snow starts melting?

A. The specific latent heat of fusion of ice is very high. So a large amount of heat is required for melting of snow, which is absorbed from the surrounding atmosphere. As a result the temperature of the surrounding falls and the weather becomes bitterly cold.

(c)Why does it become warm during snowfall?

A. The specific latent heat of fusion of ice is very high. So during the snowfall when water vapour in the atmosphere starts freezing, a large amount of heat is released to the surrounding as latent heat. So temperature of surrounding rises and it becomes warm during a snowfall.

(d)Why do the glaciers not melt completely during summer?

A. The specific latent heat of fusion of ice is very high. So a very large amount of heat is required for melting of ice in a glacier. However it is not possible for such a large amount of heat to be absorbed quickly from the surrounding atmosphere. As a result the ice in a glacier melts at a slow rate and does not melt completely in summer.

(e)Why are the burns caused by steam more severe than those caused by boiling water?

A. The specific latent heat of vapourisation of steam is very high. So steam can release a larger amount of heat to the skin than boiling water at 100^0C. Therefore the burns caused by steam are more severe than those caused by boiling water.

Chapter-2 **PHYSICAL QUANTITIES AND MEASUREMENT**

ADDITIONAL QUESTIONS

1) Define density of a substance. State its S.I and C.G.S. units. Hoe are these units related to each other?

A. The density of a substance is defined as mass per unit volume of the substance.

D= m / V (where D= density, m= mass and V =volume)

The S.I. unit of density is kg m^{-3}

The C.G.S. unit of density is g cm^{-3}

Relation: 1 g cm^{-3} = 1000 kg m^{-3}

2) Density of iron is 7.8 gcm^{-3} . What does this statement mean?

A. It means the volume of 7.8g of iron is 1cm^3 or the mass of 1cm^3 of iron is 7.8g

3) The density of iron is 7.8 g cm^{-3}. Express it in S.I.

A. 7.8 g cm^{-3} = 7.8 x 1000 kg m^{-3} = 7800 kg m^{-3}

4) The density of mercury is 13600 kg m^{-3}. Express this value in g cm^{-3}.

A. 13600 kg m^{-3} = (13600 / 1000) g cm^{-3} = 13.6 g cm^{-3}

5) What is the density of water?

A. The density of water is 1 g cm^{-3} or 1000 kg m^{-3}.

6) What happens to the following in case of an increase in temperature of a substance?

(a) volume, (b) mass, (c) density

A. With the increase in temperature, (a) volume increases

(b) mass remains unchanged

(c) density decreases

7) How do the density of a solid and density of a liquid determine whether the solid will sink or float in the liquid?

A. If the density of a solid is more than the density of a liquid then the solid will sink in the liquid. E.g iron sinks in water

If the density of a solid is less than the density of a liquid then the solid floats in the liquid with some portion submerged and rest of the portion remaining outside the liquid. E.g wood floating in water

If the density of a solid is equal to the density of a liquid then the solid floats just under the surface of the liquid. E.g ice floating in water

EXERCISE STUDY QUESTIONS

1) You are provided with a glass stopper and a measuring cylinder. How will you proceed to find the density of stopper?

A. The mass of the stopper can be measured with a physical balance very accurately. Let it be M gram **.**

In order to find the volume, measuring cylinder with some water is taken **.**Initial level of water V_1 cm^3 will be noted.

The glass stopper is tied to a thread and lowered gently in the measuring cylinder so that it is completely immersed in water. Now level of water V_2 cm^3 recorded.

Volume of stopper = V_2-V_1 = V cm^3

Hence, Density of stopper = (M / V) gcm^{-3}

3) How does the density of liquid change with rise in temperature?

A. On heating a liquid it expands. Its volume increases but mass remains same. Therefore the density of the liquid decreases. Density of liquid is inversely proportional to temperature.

4)On the basis of change of density with the change in temperature, explain how do the liquids get heated up, when heated in a vessel.

A. When a liquid is heated in a vessel the liquid close to the bottom of vessel expands, hence its density decreases. The lighter liquid rises up and to take its place the denser liquid from the upper region flows down. Thus a convection current is set up which is responsible for heating of liquid.

5) (a)How does the density of gases change with rise in temperature?

A. With rise in temperature gases expand. Their volume increases but mass remains same. Hence the density of gases decreases. Density of gases is inversely proportional to temperature.

(b) What is the importance of above phenomenon in formation of weather?

A. It is the convection currents in gases which are responsible for the formation of weather. The land and sea breeze, the monsoon, the westerlies are formed due to convection currents.

6) How is land breeze formed? Explain

A. Land breeze blows from land towards sea at night. As the sun sets, land cools much faster than sea. So the air above the warm sea also becomes warm and lighter. Hence the less dense air above the sea rises up causing a drop in pressure above sea. To equalize the pressure the cool breeze from land blows towards the sea. This is called land breeze.

7) How is sea breeze formed? Explain.

A. Sea breeze blows from sea towards the land during the day. During the day time, land is heated much faster than sea due to heat of the sun. So the air above the land also becomes warm and lighter. The less dense air above the land rises up causing a drop in pressure above the land. To equalize the pressure the cool breeze from sea blows towards the land. This is called sea breeze.

8) Two solids A and B of density 2.5 g cm $^{-3}$and 0.80 g cm $^{-3}$ are placed in a liquid L of density 1.2 g cm $^{-3}$. Which solid is likely to float and why?

A. Solis B will float because the density of solid B is lesser than the density of liquid L.

9) Why do objects like metals or stones sink in water?

A. Metals and stones are having density more than density of water, so they sink in water.

10) Why do objects made of wood or plastic float in water?

A. Wood and plastic have density less than that of water, so they float in water.

11) Why an iron needle sinks in water but an iron ship floats in water?

A. An iron needle is made from solid iron whose density is more than the density of water. So an iron needle sinks in water. But an iron ship is hollow from inside and contains air. This makes the average density of a ship to be lesser than the density of water. So an iron ship floats in water.

12) Describe comparison of densities in the three states of matter.

A. Density is mass per unit volume. So lesser the volume, greater is the density.

In case of solids, the molecules are very tightly packed in a small volume. Therefore the solids have high density due to their small volume.

In case of liquids, the molecules are not tightly packed in a small volume as compared to solids. Thus liquids have lesser density than solids.

The molecules of a gas are free to move in any direction and so they can occupy all the available space. Thus we can say gases have very large volume. Hence they have low density as compared to solids and liquids.

So in general, density of solids > density of liquids > density of gases

13) A piece of wood of mass 150 g has a volume of 200 cm^3.Find the density of wood in(a)CGS system (b) SI system.

A. mass= 150g Volume=200 cm^3

(a) density in C.G.S. = (150 g) / (200 cm^3) = 0.75 g cm^{-3}

(b) density in S.I. unit = 0.75 x1000=750 kgm^{-3}

14) 5 liters of kerosene 0il is found to weigh 4.40 kg. Find the density of kerosene in (a)CGS system (b) SI system

A. mass= 4.50 kg= 4400 g Volume= 5 litre=5000 cm^3

(a) density in CGS = (4400 g) / (5000 cm^3) = 0.88 g cm^{-3}

(b) density in S.I. unit = 0.88 x1000=880 kgm^{-3}

15) Calculate the volume of wood of mass 6000 kg when the density of wood is 0.8 g cm^{-3}

A. mass=6000kg density =0.8 g cm^{-3}=0.8 x100 kgm^{-3}=800 kgm^{-3}

Volume = mass / density = (6000 kg) / (800 kg m^{-3})= 7.5 m^3

16) Volume if a metal cube is 200 cm^3. If its density is 7.5 g cm^{-3}, find the mass of cube in kilograms.

A. Mass = Volume x density

= 200 cm^3X 7.5 g cm^{-3}

=1500g = 1.5 kg

ADDITIONAL QUESTIONS

1) Why the Plimsoll lines are marked around the hull of ship?

A. The plimsoll lines are marked around the hull of ship to indicate the level to which the ship should be submerged in sea water at some particular location.

2) Why the fisher men set sail for fishing during night?

A. Fishermen set sail during night because the land breeze rapidly carries them far off in the sea. After casting their nets they collect fish in the morning and set sail towards land around 10am. At this time the sea breeze starts blowing and helps them to reach the land quickly.

3) Why it is easier to swim in sea water than in river water?

A. Sea water contains dissolved salt and hence the density of sea water is more than the density of river water. So while swimming, a smaller portion of the swimmer's body remains submerged in sea than that in river water. Hence it is easier for the swimmer to swim in sea water than in river water.

4) Why the empty ships are filled with water or ballast?

A. The empty ships are filled with ballast because if the ships will not be loaded up to the recommended plimsoll line, then it will overturn due to wind or rough sea.

5) Why the room heaters are provided at the bottom of the room whereas Airconditioners are near the roof?

A. A Room heater is provided at the bottom of the room so that as it heats the air around it, the hot air being less dense, rises up and allows the upper cold dense air to come down and get heated. So the convection current is set up which helps in heating the room quickly.

In the otherhand an airconditioner is provided near the roof of the room so that as it cools the air around it, the cold air being more dense, sinks down and allows the lower warm and lighter air to rise up and get cooled. So the convection current is set up which helps in cooling the room quickly.

Chapter-3 FORCE AND PRESSURE

EXERCISE 3.1

1) (a) State the turning effect of force with example from daily life.

A. When a force is applied on a body which is fixed at a point then the body turns about the fixed point. This is known as turning effect of force.

Example: (1) A door turning about the hinge on applying a force.

(2) The weight of a child sitting on a see-saw causes the see-saw to turn about the fulcrum.

(b) Define moment of force. State its units

A. The product of force and the perpendicular distance of the line of action of force from the axis of rotation is called moment of force or torque.

Moment of force= F X d

SI unit : N×m CGS unit : dyne x cm

ADDITIONAL QUESTIONS:

1) State the factors on which moment of force depends.

A. The moment of force depends on following two factors:

(1) the force applied

(2) the perpendicular distance from the fixed point to the line of action of the force.

2) State the method to increase the turning effect of a force produced in a body.

A. By increasing the perpendicular distance between the line of action of force and the fixed point or pivoted point, the turning effect of the given force produced on a body can be increased.

3) What is a couple? What is its effect? Give any two examples of couple action.

A. A pair of equal sized forces acting in opposite directions and different lines is called a couple. The effect of couple acting on a body is to produce turning effect. For example: turning the screw cap of a bottle, turning the spindle of a water tap etc.

EXERCISE 3.1

2)(a)Define the term pressure.

A. The thrust applied or acting per unit area is called pressure.

Pressure = (thrust) / (area)

(b) State and define the SI unit of pressure.

A. The S.I. unit of pressure is 'pascal' or Pa.

The pressure acting on a surface in said to be one pascal, if one newton of force acts per $1m^2$ area of the surface.

3) Explain the following:

(a)Why are double tyres provided at the rear wheels of a truck?

A. Pressure is inversely proportional to the area of cross-section i.e. more the area of cross-section, lesser is the pressure. The double tyres at the rear wheels of a truck increase the area of cross-section. Hence the weight of the truck applies less pressure on the ground. Hence the truck can move smoothly on the road.

(b)Why can a camel easily cross the desert but not a horse?

A. Camels have broad feet and so the area of cross-section is more. So the pressure exerted on sand remains less . So a camel can move in desert easily without its feet sinking in the sand. But a horse has less area of hooves for which the horse applies more pressure on sand. So its feet sink in the sand and it is difficult for it to cross the desert..

(c) Why are long skies used for gliding over snow?

A. Pressure is inversely proportional to the area of cross-section i.e. more the area of cross-section, lesser is the pressure exerted. Long skies have wider and flat base area. So a person standing on such a ski exerts less pressure on the snow due to his body weight. This helps the skier to slide easily over snow without sinking his feet in the snow.

(d)Why is the foundation of a building made very wide as compared to walls?

A. Pressure is inversely proportional to the area of cross-section i.e. more the area of cross-section, lesser is the pressure exerted. A tall rise building is liable to sink in the ground due to its own weight if the soil is soft. This results cracks to develop in the walls of the building. To prevent this, the foundation of high rising buildings is kept very wide so that the pressure exerted on ground remains less.

(e)Why do army tanks move over the wide steel chain rather than on the wheels?

A. Pressure is inversely proportional to the area of cross-section i.e. more the area of cross-section, lesser is the pressure exerted. Wide steel chain increases the area of cross-section. Therefore the heavy weight of the tank exerts less pressure on the ground and helps the tank run smoothly on the ground.

(f) Why is the edge of knife kept sharp?

A. Pressure is inversely proportional to the area of cross-section i.e. less the area of cross-section more is the pressure. The edges of knife are kept sharp. By doing so the area of cross-section decreases. So the force applied produces a greater pressure due to which the knife can easily cut through an object.

(g) Why is one end of drawing board pin broad and flat, whereas its other end is pointed and sharp?

A. Pressure is inversely proportional to the area of cross-section i.e. lesser the area of cross-section more is the pressure and vice versa. It is for this reason that drawing pin is kept broad (more area) from the thumb side but very sharp(less area) from the pin side. The broader thumb tack reduces pressure on the thumb but sharp pin tip increases the pressure on the wooden board. So we can push the pin easily as well as the pin penetrates easily into the board.

(h) Why does a sharp nail easily penetrate wood, but not a blunt one?

A. Pressure is inversely proportional to the area of cross-section i.e. lesser the area of cross-section more is the pressure and vice versa. A sharp nail has a very small area of

contact in comparison to that in a blunt nail when pressed on wood. So the force applied produces more pressure in sharp nail. So with a greater pressure, the sharp nail can penetrate easily in wood.

4) A force of 16N acts on an area of 50 cm^2. What is the magnitude of pressure in pascal?

A. F = 16N A = 50 cm^2 = (50/10000) m^2 = 0.005 m^2

Pressure = F / A = (16 N) / (0.005 m^2) = 3200 Pa

5)A force of 200N acts on an area of 0.16 m^2. What is the magnitude of pressure in pascal?

A. F = 200N A = 0.16 m^2

Pressure = F / A = (200 N) / (0.16 m^2) = 1250 Pa

6)What is the magnitude of force which produces a pressure of 7000 Pa while acting on a area of cross=section of 0.25m^2.

A. P= 7000 Pa A = 0.25 m^2

Force = P X A = 7000 Pa X 0.25 m^2 = 1750 N

7)A force F on an area of 600 cm^2 and pressure of 12500Pa. Calculate the magnitude of F.

A. P =12500Pa

A=600 cm^2= 600/10000 =0.06 m^2

F=12500 X 0.06=1750 N

8) A force of 300 N while acting on an area A, produces a pressure of 1500Pa. Calculate the magnitude A in cm^2.

A. Area = Force / pressure

=300N/ 1500pa

=0.2 m^2

=0.2X 10000cm^2

=2000cm^2

9) What is the area of cross-section of a body in m^2, when it exerts a force of 50 N and produces a pressure of 2000 Pa?

A. Area = Force / pressure

=50N/ 2000Pa

=0.025 m^2

EXERCISE 3.2

1)How does the liquid pressure depend upon the following:

(a)depth of liquid: It is directly proportional to depth of the liquid column i.e. more is the depth more is the liquid pressure.

(b)density of liquid: It is directly proportional to the density of liquid i.e. more the density of liquid more is the liquid pressure.

(c)acceleration due to gravity: It is directly proportional to acceleration due to gravity.

(d) area of cross-section of containing vessel: Pressure in liquid does not depend on area of cross-section of liquid in the container

2) State Pascal's law for transmission of pressure in enclosed liquids.

A. Pascal's law states that when pressure is applied to any part of an enclosed liquid, it is transmitted equally and undiminished in all directions of the liquid.

3) Why are the walls of hydroelectric dam made thicker at the base?

A. Liquid pressure increases with the increase in depth of the liquid. So in a dam, the pressure exerted by water is maximum at the bottom and this pressure acts in lateral direction also. This immense pressure acts on the base of the wall and can cause it to collapse. So to prevent this, walls of the dam are made thicker at the base. It provides strength to the walls.

4) Why do the deep sea divers wear specially designed suits?

A. Liquid pressure increases with the increase in depth of the liquid. So in the sea, the pressure exerted by water is maximum at the bottom. This enormous pressure can crush the bodies of sea divers. So for safety they wear specially designed suits to counterbalance the pressure exerted by water in deep sea.

5) Why are the hulls of submarines specially strengthened?

A. Liquid pressure increases with the increase in depth of the liquid. So in the sea, the pressure exerted by water increases with the depth and can crush the hull of the submarine. So to safeguard, the hulls of submarine are specially strengthened to withstand huge pressure of sea water.

6) Why do the bodies of deep sea fish burst when they are brought to the surface of sea?

A. Liquid pressure increases with the increase in depth of the liquid. So in the sea the pressure of water is more at a greater depth. So to keep a balance, the blood in the bodies of deep sea fishes also flow at a very high pressure. However, when these fishes are brought to the surface, the pressure outside suddenly decreases. This difference in pressure bursts opens their bodies.

EXERCISE 3.3

1) What do you understand by the term atmospheric pressure? What is its average value at sea level?

A. The force exerted by atmosphere per unit area on the surface of the earth is called as atmospheric pressure. Its average value at sea level is 1,00,000 pascal.

2) The atmospheric pressure on a hill is 68cm of mercury. What do you understand from the statement?

A. The statement means that the pressure exerted by atmosphere at the hill is same as the pressure exerted by a mercury column of vertical height 68 cm.

3) How does the atmospheric pressure change with change in altitude?

A. As the altitude increases, the atmospheric pressure decreases. This is so because with the increase of altitude, the height of atmospheric column as well as the density of air decreases.

4) Briefly describe construction of a simple barometer.

A. A simple barometer is used to measure atmospheric pressure. It consists of a long glass tube containing dry mercury standing vertically erect with its mouth dipped in mercury taken in a trough. The height of the mercury column measured from the surface of the mercury in the trough to the surface of mercury in the tube stays balanced with the atmospheric pressure of the place. As the atmospheric pressure of the place changes, the height of the mercury column also changes proportionally. That is why the atmospheric pressure measured by a simple barometer is expressed as the height of mercury column called the barometric height. The empty space above the barometric height in the glass tube is called torricellian vacuum.

5) Why is mercury used as barometric liquid? Give three reasons.

A. i) Mercury is the heaviest liquid. So a short length of mercury column (about 76 cm) is good enough to counterbalance the normal atmospheric pressure.

ii) It does not vapourise under vacuum conditions. Also it does not stick to glass. Hence it gives accurate reading.

iii) It is opaque in nature. So it can be seen easily in a glass tube.

6) Why water is not used as barometric liquid? Give two reasons.

A. i) Density of water is too less to be used in a barometer. Due to low density, a water column of long height (nearly 10.34 m) is required to balance with the atmospheric pressure. As it is very difficult to have a barometer tube of 10.34m of height length, water barometer is an impracticable idea

(ii) Water vapourises under vacuum condition and hence a water barometer would never show correct measurement of atmospheric pressure.

7) Explain the following:

(a) Why do ink pens start leaking at high altitudes?

Ans:- Normally a fountain pen filled with ink contains some air which is at a pressure equal to the atmospheric pressure on the earth surface. When the pen is taken at an altitude, the atmospheric pressure at this altitude is low. So the excess pressure due to air inside the rubber tube forces the ink to leak out.

(b) Why don't we feel the enormous atmospheric pressure acting on us?

Ans:- We do not feel this enormous atmospheric pressure acting on our body due to the fact that the blood pressure in our body is slightly more than the atmospheric pressure. So the blood pressure and atmospheric pressure counterbalance each other.

(c) Why does the nose of some people start bleeding when an aeroplane climbs up suddenly?

Ans:- At a high altitude, the atmospheric pressure falls drastically. So the blood pressure in our body cannot get balanced with the atmospheric pressure and becomes excess of the atmospheric pressure. This causes the fine blood vessels in the nostril to split open and blood oozes out. This is the cause of nose bleeding at high altitudes.

(d) Aeroplanes are provided with pressurized cabins for the passengers.

Ans:- As an aeroplane rises to a high altitude, it encounters low atmospheric pressure. So the blood pressure of passengers body exceeds the atmospheric pressure. This would cause health problem in the passengers such as nose bleeding. Hence for the safety of the passengers, the inside of the aeroplane is pressurized such that their blood pressure can be balanced with the outside air pressure.

(e) One can drink a soft drink easily using a straw.

Ans:- By sucking the straw, the air inside it passes to the lungs. So the air pressure inside the straw decreases. This makes the atmospheric pressure acting on the surface of the soft drink to become more than air pressure inside the straw. So the atmospheric pressure pusses the drink to enter in the straw and to rise to the mouth.

(f) Liquid rises in a syringe when its piston is pulled backwards.

Ans:- By pulling the piston backwards, the volume of empty space in the syringe increases. This causes the pressure inside the syringe to decrease. Hence the outside atmospheric pressure acting on the liquid surface becomes excess and pushes the liquid to enter in the syringe through the capillary tube. Hence the liquid rises in the syringe.

ADDITONAL QUESTIONS

1)Define- force

A It is a physical cause which can bring some charges in shape and size, state of rest and state of motion and the direction of a body.

S.I unit is NewtonCGS – dyne.

1N-10^5 dyne

2)Name the factors on which torque depends. State its SI unit.

A Factors affecting the turning of a body.

(i)Magnitude of force applied

(ii)The distance of line of action of force from the axis of rotation (pivoted point)

Units :SI : N×M **, CGS:** dyne xcm

3)Give two Examples of turning effect of force (torque)

1) To open or shut a door we apply a force normal to the door at its handle which is at the maximum distance from its hinge.

2)In a bicycle we turn the way a small force is applied on the pedal to the toothed wheel so that the perpendicular distance of point of application of force from the axis wheel is large.

4)Define (i) couple (ii) pressure (iii) Thrust

Couple Two equal and opposite parallel forces not acting along a same line from a couple. It always needed to produce a rotation

Example- Turning a water tap, tighting a cap of a bottle, turning the key in a hole of a lock, turning the stirring of a motor car, driving the pedal of a bicycle etc.

Pressure –The thrust applied or acting for unit area is called pressure.

$P = \frac{\text{Thrust}}{\text{Area}}$

Thrust The force acting perpendicularly on the surface is called as thrust.

Unit of Pressure S.I unit- $P = \frac{F}{A} = \frac{N}{m^2} = Nm^{-2}$ = Pascal CGS- $Dyne.cm^{-2}$

5)Define pascal: The pressure acting on the surface in said to one pascal, if one newton of force acting on a surface of area $1m^{-2}$.

6)State the factors on which pressure depends.

Factors affecting the pressure acting on a surface.

(i)Pressure directly proportional to the thrust (force) i.e. more the thrust more is the pressure.

(ii)Pressure is inversely proportional to the area of cross-section i.e. less the area of cross-section more is the pressure example- i) Foundation of high rising building are kept very hide so that they do not sink under the extremely high pressure of building. ii) The edges of cutting instruments are sharpened from cutting edges by doing so the area of cross-section decreases surface.

7)Define lateral pressure-

A The pressure exerted by a liquid on the walls of the container is called as lateral pressure.

8)State the factors on which the lateral pressure depends.

Factor affecting the lateral pressure –

(a)It is directly proportional to height of the liquid column i.e. more is the height more is the lateral pressure.

(b)It is directly proportional to the density of liquid i.e. more the density of liquid more is the lateral pressure.

(c)It is directly proportional to acceleration due to gravity.

(d)Pressure in fluid (lateral pressure) does not depend on area of cross-section of liquid in the container.

9)Define Pascal's law.

Pascal's Law It states that when pressure is applied to any part of an enclosed liquid, it is transmitted equally in all directions with undiminished force and acts at right angles to the surface of vessels.

10)What is a barometer? How it measures Barometer the atmospheric pressure.

A It is a device which is used to measure atmospheric pressure. The normal atmosphere pressure is 76cm/760mm/0.76m.

Vertical height of liquid column –

ii) If the Barometric height is less than 76cm less than it indicates that the atmospheric pressure has fallen and if it is more than 76cm then it indicates that the atmospheric pressure is increased.

*11)*Name a barometer in which no liquid is used.

A Aneroid barometer

12)What is the principle of lift pump.

A Air exert pressure and can support 10.34m vertical length of water in a closed tube.

Chapter -5 LIGHT ENERGY

EXERCISE 5.1

1) Define the following:

(a)Angle of incidence: The angle between the incident ray and the normal is called angle of incidence.

(b)Angle of reflection: The angle between the reflected ray and the normal is called angle of reflection.

(c)Normal: The perpendicular drawn at the point of incidence is called normal.

(d) Incident ray: The incoming ray is called incident ray.

(e)Reflected ray: The light ray after reflection is called the reflected ray.

2) (a)What is meant by reflection?

A. The phenomenon of bouncing back of light to the same medium after striking on a surface is called as reflection of light.

(b) State the laws of reflection?

A . First law:- Angle of incidence is equal to the angle of reflection i.e. <i=<r.

Second law:- The incident ray, the reflected ray and the normal at the point of incidence lie on a same plane.

3) (a) Define real and virtual image.

A. The image which can be obtained on the screen is known as real image. The image which cannot be obtained on the screen is known as virtual image.

(b) Differentiate between real and virtual image.

Real image	Virtual Image
i) It can be taken on the screen	i) It cannot be taken on the screen
ii) It is always inverted	ii) It is always erect
iii) It is formed due to actual intersection of light rays.	iii) It is formed when light rays appear to meet at a point.

4) (a) Define plane mirror.

A. A smooth and polished surface which can turn back the rays of light into the same medium is called plane mirror. It is generally a glass plate with a silvered surface.

(b) State the characteristics of the image formed by a plane mirror.

A. i) The image is virtual, erect and laterally inverted.

ii) The image is of same size as the object.

iii) The image is formed at the same distance behind the mirror as the object is situated in front of the mirror.

(c) State uses of plane mirror.

A. The uses of plane mirror are:

i)Plane mirrors are used as looking glass.

ii)Plane mirror are used for making periscope and kaleidoscope.

iii)Plane mirrors are used by barbers to show the customers the backside during haircut.

Iv) Plane mirrors are used for providing false dimensions in showcases, displaying jewelry etc.

5) Differentiate between regular and diffused reflection.

Regular reflection	Diffused reflection
i) Occurs on a smooth and polished surface. E.g. reflection from a plane mirror.	i) Occurs on a rough surface. E.g. reflection from wood, paper surface etc
ii) If the incident rays are parallel to each other then the reflected rays too remain parallel to each other.	ii) If the incident rays are parallel to each other then the reflected rays are not parallel to each other but spread to different directions.
iii) Image can't be seen	iii) Image can be seen

6) Describe the principle and working of the periscope.

A. A periscope is a device used to see the image of an object by raising the periscope overhead when the object is behind an obstacle.

It works on the principle of reflection of light by a pair of parallel plane mirrors held at 45^0 angle to horizontal.

A periscope is made up of a rectangular long tube with plane mirrors fixed at an angle of 45^0 within the tube. The mirror surfaces are arranged parallel to each other. Light from the object is incident on the mirror on the top part of the tube. This mirror then reflects the light to the mirror on the bottom part of the tube. The objects can be clearly seen by placing the eye in line with the bottom mirror.

The image is virtual, erect but without any lateral inversion.

EXERCISE 5.2

1) Define the following:

i) Pole ii)Centre of curvature iii)Principal axis iv)Radius of curvature v)Principal focus

A Pole: Geometric center of the spherical mirror is called pole.

Centre of curvature – The center of the hollow sphere of which the spherical mirror is a part is called center of curvature.

Principal Axis- An imaginary line passing through the pole and center of curvature of a spherical mirror is called principal axis.

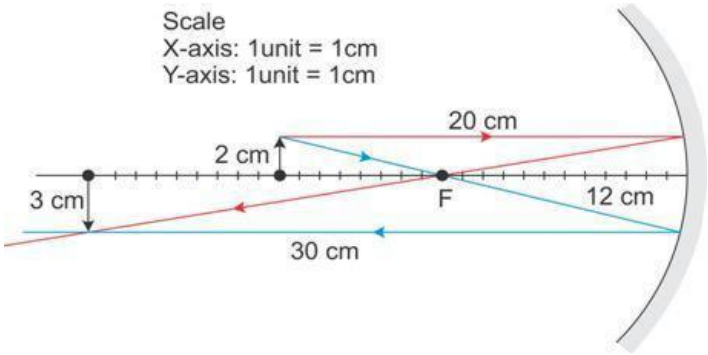
Radius of curvature – The radius of hollow sphere of which the spherical mirror is a part is called radius of curvature.

Principal Focus of concave mirror – The point on the principal axis where a beam of light, travelling parallel to principal axis, after reflection, actually meet is called principal focus of concave mirror.

Principal focus of convex mirror – The point on the principal axis where a beam of light, travelling parallel to principal axis, after reflection, appears to come is called principal focus of convex mirror

2) Draw a neat diagram and state the characteristics of image formed when:

A.(a)An object is placed between the principal focus and center of curvature of aconcave mirror



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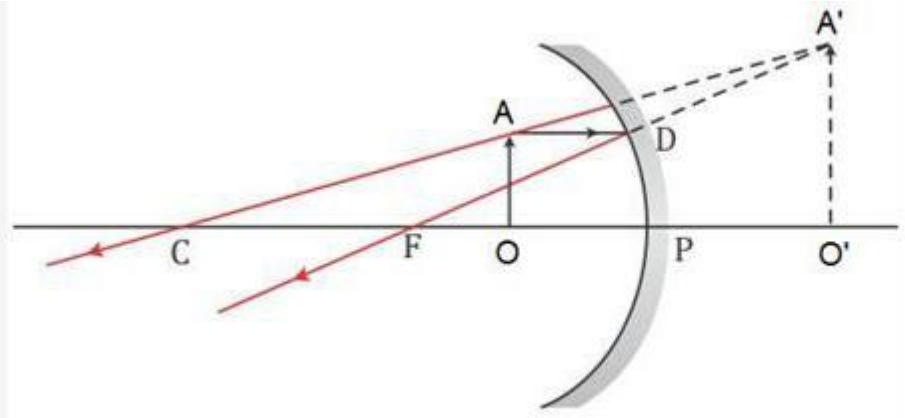
A.(b)A object is placed between the principal focus and pole of concave mirror



The image formed is virtual, erect and magnified.

(c) An object is anywhere between the pole and infinity in convex mirror:

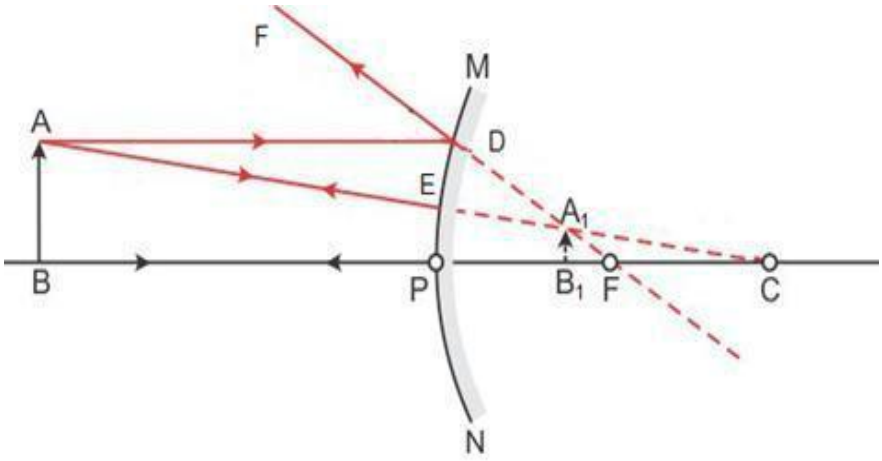


Image formed is virtual, erect and diminished.

3) State the uses of concave and convex mirrors.

A. Uses of concave mirror

i) It is used as a shaving mirror

ii) It is used as a reflector in head lights, torch lights

iii) It is used by doctors as head mirror

Uses of convex mirror

i) It is used street lights as reflector

ii) It is used as rear view mirror in vehicles.

5) You are provided with (a) a plane mirror, (b) a convex mirror and (c) a concave mirror. How will you distinguish between them without touching them?

A. a) If image is upright, of same size and it does not change in size by moving the mirror towards or away from the face, the mirror is plane.

b) If image is upright, diminished and decreases in size on small movement of the mirror away, the mirror is convex.

c) If image is upright, magnified, and increases in size on small movement of the mirror away, the mirror is concave.

EXERCISE 5.3

1) What do you understand by the term refraction of light?

A. The phenomenon due to which a ray of light deviates from its path, at the surface of separation of two optical medium, when the ray of light is travelling from one optical medium to another optical medium, is called refraction of light.

2) Why a coin placed in a bowl of water appears to be raised?

A. When the rays of light from the coin travel from water (denser medium) to air (rarer medium), the refracted rays bend away from the normal. Since the rays appear to come from a point above the coin, it appears to be raised

4) State the law of refraction.

First law:- The Incident ray, the refracted ray and the normal at the point of incidence lie in the same plane.

Second law:-The ratio between the sine of angle of incidence to the sine of angle of refraction is a constant for a pair of media.

$$(\sin i) / (\sin r) = \text{constant}$$

5) How are the angle of incidence and angle of refraction related to each other when

A. (a) When a ray of light travels from rarer to denser medium, it bends towards the normal.

Here Li>Lr

(b) When a ray of light travels from denser to rarer medium, it bends away from the normal

Here Li>Lr

(c) When a ray of light strikes normally on the surface separating the two media then it moves in the same straight line without any deviation

Here Li= Lr =0^0

6) (a) What do you understand by the term refractive index?

A. The refractive index of a medium can be defined as the ratio between the velocity of light in air or vacuum to the velocity of light in the medium.

Refractive index of a medium = $\frac{\text{velocity of light in vacuum/air)}}{\text{(velocity of light in the medium)}}$

Refractive index has no unit, because it is a simple ratio.

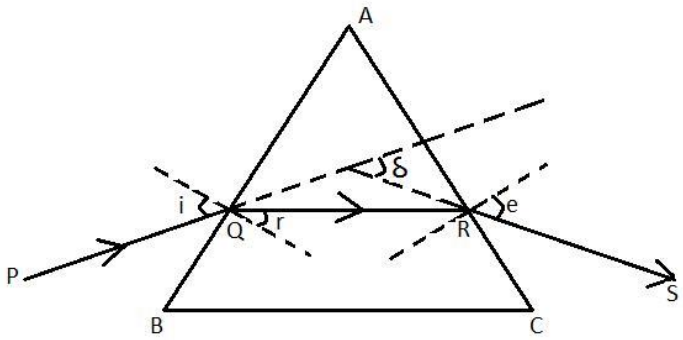
6) (b) If the velocity of light in vacuum is 3X 10 ^{8}m s^{-1} and in another medium M is 0.75 X 10 ^{8}m s^{-1}.What is the refractive medium of M?

A. Refractive index of M = $\frac{\text{Speed of light in air on vacuum}}{\text{Speed of light in M}} = \frac{3X\ 10^8\ m/s}{\frac{0.75X\ 10^8\ m}{/s}} = 4$

EXERCISE 5.4

1) Draw a neat diagram for the passage of a ray of light through an equilateral glass prism, Showing clearly (a)angle of incidence (b)angle of emergence(c)angle of deviation(d)angle of prism.

A.



BC=Principal section of glass prism

PQ=monochromatic incident ray

QR= refracted ray

RS=emergent ray

i= angle of incidence

r =angle of refraction

e = angle of emergence

δ= angle of deviation produced in the path of the light ray
A=angle of prism

2) Define the following:

A(i) Angle of incidence: The angle between the incident ray and the normal is called angle of incidence.

(ii)Angle of refraction: The angle between the refracted ray and the normal is called angle of reflection.

(iii)Prism: A prism is a piece of glass on any other transparent material, which is bounded by two triangular surfaces and three rectangular surface.

(iv) Angle of emergence: The angle between the incident ray and the normal is called angle of emergence.

(v)refracting angle of prism: The angle between tworefracting surfaces is called angle of prism.

2) (b)How are the angle of incidence, angle of prism, angle of emergence and angle of deviation related to each other.

A. i+ e= A+ D

(angle of incidence)+(angle of emergence)=(angle of prism)+(angle of deviation)

4) (a) Define the following:

A. **(i) Spectrum**: The band of seven colours obtained on the screen when white light is passed through the prism is known as Spectrum.

(ii) Dispersion: The splitting of white light into its constituent colours when passed through a prism is known as Dispersion.

4) (b) Why does the white light spilt on the first refracting face of prism?

A. Different colours of light have different speed in glass and angle of deviation is different for the colours.

5) **Write the colours of spectrum in proper order starting from red.**

A. Red, Orange, Yellow, Green, Blue, Indigo, Violet.

6) During dispersion of white light, which colour (i) deviates least (ii) deviates most.

A. (i) Red deviates the least (ii) Violet deviates the most.

ADDITONAL QUESTIONS

1) Define the following:

Light It is a form of energy which produces the sensation of site.

Reflection The process of bouncing back of light to the same medium after striking on a surface is called as reflection of light.

2)Define (i) spherical mirror (ii) concave mirror(iii)convex mirror

I)Spherical mirror- A mirror which is a part of a hollow sphere is called spherical mirror.

ii) Concave mirror – A spherical mirror which is polished from outer curved side, such that its reflecting surface is towards the hollow side is called concave mirror.

iii) Convex Mirror- A spherical mirror which is polished from hollow side, such that reflecting surface is towards outer side is called convex mirror. .

3)Name the rays that are used draw the ray diagram/route to draw a ray diagram.

Ray1- Ray of light parallel to principal axis after reflection either actually passes through the principle focus on appears to pass through the principle focus.

Ray 2 – Ray of light which passes through the principle focus or appears to travels along the principle focus after reflection will travel parallel to principle axis.

Ray 3 – Ray of light which passes through center of curvature or appears to travel along center of curvature after reflection travels back along the same path

4) Name the kind of mirror used:

(a)Shaving mirror - Concave, (b)Doctor's head mirror- Concave, (c) Rear view mirror- Convex and (d) Reflectors in headlight of automobiles- Concave

5)Make a table for relative position of object and image in convex mirror.

position of object	position of image	Nature of image
1. At infinity	At 'F' behind the mirror	Virtual erect and highly diminished
2. Anywhere between pole and infinity	Between 'F' and 'P' behind the mirror	Virtual, erect and diminished

6). Refractive index of glass is 1.5. what does this statement mean?

It means speed of light in air or vacuum is 1.5 times the speed of light in glass.

$$\frac{h}{\left[\frac{h}{h}\right]} = \frac{1.5}{\left[\frac{1}{1.5\times h}\right]}$$

7)How the angle of deviation depends on the wavelength of light.

A. Less is the wavelength of light, more is the angle of deviation and vice versa. Therefore, violet color has least name length having maximum angle of deviation and Red color having maximum wavelength and less deviation.

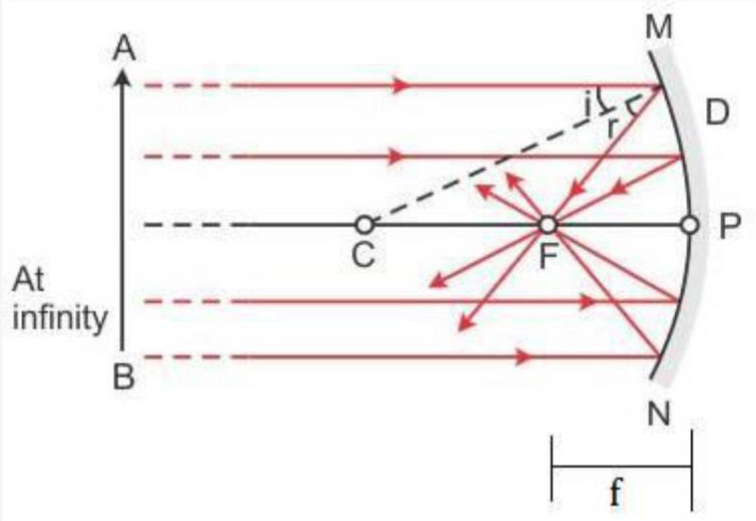
8)Name the phenomenon that are taking place in the first and the second surface of the prism while a white light is allowed to pass through it.

A In the first surface splitting of white light (dispersion) occurs and in the second face every color of light bents, so refraction takes place.

9) Define the terms focus and focal length of a concave mirror. Draw diagram to illustrate your answer.

Ans. Focus of a concave mirror: The focus of a concave mirror is a point on the principal axis through which the light rays incident parallel to principal axis, pass after reflection from the mirror.

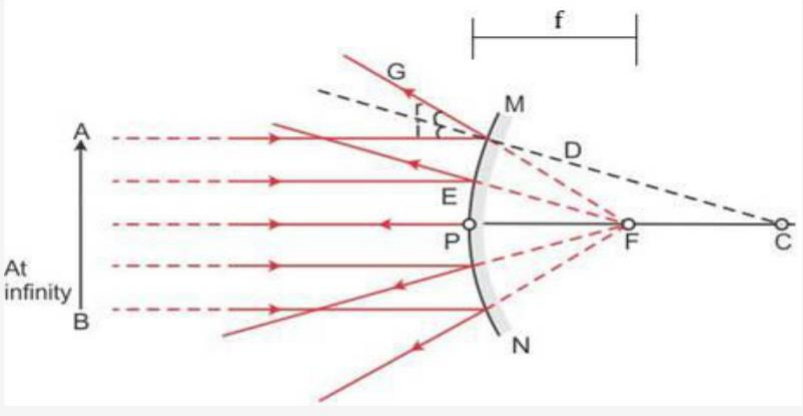
Focal length of a concave mirror: The distance of the focus from the pole of the concave mirror is called its focal length.



10)Explain the meaning of term focus and focal length in case of a convex mirror, with the help of a suitable ray diagram.

Ans. Focus of a convex mirror: The focus of a convex mirror is a point on the principal axis from which, the light rays incident parallel to principal axis, appear to come, after reflection from the mirror.

Focal length of a convex mirror: The distance of the focus from the pole of the convex mirror is called its focal length



11)Make a table for relative position of object and image in concave mirror.

position of object	position of image	Nature of image
1. At infinity	At ‘F’	Real, invented and highly diminished
2. Between infinity and ‘C’ or beyond ‘C’	Between ‘C’ and ‘F’	Real, invented, diminished
3. At ‘C’	At ‘C’	Real, invested same size as object
4. Between ‘C’ and F	Beyond ‘C’ but not at infinity	Real, invested and enlarged
5. At ‘F’	At infinity	Real, invested and highly enlarged
6. Between ‘P’ and ‘F’	Behind the mirror	Virtual erect and enlarged

STD-8

PHYSICS QUESTION BANK

SECOND TERMINAL PORTION

CHAPTER 4 **ENERGY**

EXERCISE 4.1

1.a) What is energy?

Ans. Energy is the capacity to do work.

b) What do you understand by work?

Ans. work is said to be done when a force applied on a body causes a displacement in its own direction.

c) Is the energy spent on thinking or talking a kind of work? Give reason for your answer.

Ans. No, because of no displacement of the body.

2.a) When does a force do work?

Ans. When a force causes a displacement in its own direction then work is said to be done.

b) State two examples when force acting on a body does not do any work.

Ans. i) A man pushing a wall.

ii) A girl carrying a school bag on her shoulder.

c) State the mathematical expression for work.

Ans. Work= Force ×Displacement.

d) Name the SI unit of work.

Ans. joule.

3.The SI unit of work and energy is Joule. Explain why the work and energy have the same units?

Ans. Work and energy are inter-convertible quantities. So they have same unit.

4. A force of 25 N causes a displacement of 4m in its own direction. What is the magnitude of work done?

Ans. Work =F×S=25×4=100J

5. A boy does a work of 800J in dragging a sack of rice to a dist10m. What is the magnitude of force applied by the boy?

Ans. F=W/S=800/10=80N.

6. A girl applies a force of 50N in pushing a table such that work done by her is 25J. Calculate the displacement produced in the table.

Ans. Displacement =W/F=25/50=0.5m

EXERCISE 4.2

1 a) What is potential energy?

The energy possessed by a body due to its change in shape, configuration or state of rest.

b) Two factors that determine potential energy.

Ans. i) Change in position of body.

ii) Change in shape.

c) Four examples of potential energy.

Ans. I) Energy possessed by a wound-up spring.

ii) Energy possessed by a stretched bow.

iii) Energy possessed by stretched rubber sling of a catapult.

iv) Energy possessed by stone raised to a height.

2.a) What is kinetic energy?

Ans. The energy possessed by a moving body by virtue of its motion is called kinetic energy.

b) Two factors that determine kinetic energy.

Ans. i) Mass of the body.

ii) Velocity of the body.

c) Four examples of kinetic energy.

Ans. The energy possessed by

i) A moving car
ii) A flying bird.
iii) A bullet fired from a gun.
iv) Flowing water in a river.

d) Two bodies have equal mass. The speed of one body is twice the speed of other. What is the ratio of KE of the two bodies?

Ans. $m_1=m_2=m$

$v_1=2v$

$v_2=v$

$KE_1/KE_2=1/2m_1v_1^2 \div 1/2m_2v_2^2=m\times (2v)^2 \div m\times v^2=4:1$

3. By giving an example state and explain the law of conservation of energy.

Ans. In an oscillating pendulum the energy at extreme position is PE which is converted to KE when it reaches the mean position. This explains the law of conservation of energy which states that energy can neither be created nor be destroyed. It can only be changed from one form to another.

4. A stone of weight 2kgf is lying on the roof of a building 60m high. Calculate the amount of stored energy in the stone.

Ans. W=mg=2kgf=2×10N=20N

h=60m

Stored PE=mgh=20×60=1200J

5. A stone of weight 0.25kgf is projected vertically upward such that it attains a height of 40m. Calculate the amount of energy in the stone at the highest point.(1kgf=10 N)

Ans. PE=mgh=0.25×10×40=100J

6. A boy of mass 50kg climbs stairs by spending 1200J of energy. How high does the boy climb up? g=10 m s^{-2}

Ans. h=mgh/mg=PE/mg=1200/ (50×10) =2.4m

7. A stone of mass 0.1kg is projected vertically upward by expending 80J of energy. How high the stone rises?

Ans. h=PE/mg=80/ (0.1×10) =80m

8 .State the kind of energy in case of the following.

a) Stone resting on the top of a hill: PE
b) An arrow shooting from a stretched bow and arrow system: KE
c) A flying mosquito: PE&KE
d) A wound-up spring of a toy car: PE
e) A speeding car; KE
f) A bullet fired from a gun: KE

9.40kg of water flows out of a tap at uniform speed of 5m/s. Calculate the amount of energy possessed by the water.

Ans. $KE=1/2mv^2=1/2\times 40\times 5\times 5=500J$

10.A train of mass 100 tones is moving with a uniform sped of 2m/s. Calculate the amount of energy possessed by the train.

Ans. $KE=1/2mv^2=1/2\times100\times1000\times2\times2=2,\ 00,000J$

11.A car expends an energy of 25000J while moving at a constant speed of 5m/s. What is the mass of the car?

Ans. $KE=1/2mv^2$

$=>25000=1/2\times m\times5\times5$

$=>m=2000kg$

12. A vehicle expends an energy of 40000J while moving at a constant speed of 10m/s. What is the mass of the vehicle?

Ans. $m=2K/v^2=2\times40000\div100=800kg.$

Exercise 4.3

1(a). What is mechanical energy?

Ans: All forms of kinetic and potential energy are called mechanical energy.

(b). What kind of energy changes takes place in the bodies of living beings so as to produce mechanical energy?

Ans: The energy in the food of living beings is converted into heat energy after digestion. The heat energy is then converted into muscular energy or mechanical energy.

2(a).Give a simple example to prove that heat is a form of mechanical energy.

Ans: When we cook food in a pressure cooker, heat changes into steam which lift the weight of the lid and whistles. This shows heat can do work.

(b).Name three devices/industries in which heat energy is put to some useful work.

Ans: I. steam engine

ii. thermo electric power stations

iii. automobile engines

3(a). Give a simple example in nature to prove that light is a form of energy.

Ans: When a very intense beam of light falls on fine dust particles, they are found to move. This shows that light is a form of energy.

(b). Give examples to prove; I) light changes into chemical energy.

ii) light changes into electric energy.

Ans: I) In plants light energy is changed into chemical energy by the process of photosynthesis

ii) In a solar cell, light energy changes into electrical energy.

4(a). Give a simple example to prove that sound is a kind of energy.

Ans. When sound waves fall on our eardrum it vibrates. This shows that sound is a form of energy.

(b). Name a device which converts sound energy into a) electric energy b) magnetic energy.

Ans: I) A microphone converts sound energy into electrical energy.

ii) A magnetic microphone converts sound energy into magnetic energy.

5(a): Why is electric energy called the most desirable forms of energy?

Ans: Electric energy can be easily converted into all other forms of energy.

(b). Name two devices which convert electric energy into

i) Heat energy only

ii) Heat and light energy

iii) Mechanical energy

iv) Magnetic energy

Ans. i) Electric heater, Geyser

ii) Electric bulb, electric heater

iii) Electric motor, Mixer grinder.

iv) Electromagnet, Electric bell.

6. What is chemical energy? To what uses is this energy put?

Ans. Chemical energy is the energy possessed by atoms of elements on account of the arrangement of electrons in them. It can be used as heat energy, mechanical energy, electrical energy etc.

7. Briefly describe nuclear energy and its

I) one use

ii) one misuse

Ans. The energy produced during the breaking of a heavy nucleus or making of a nucleus is called nuclear energy.

One use is it can be used in nuclear power plants to produce electricity.

One misuse is it can be used in atom bombs to cause massive destruction.

8. Give three examples of inter conversion of chemical energy into other forms of energy.

Ans.I) Chemical to light energy: burning of a candle

ii) Chemical to heat energy: burning of coal

iii) Chemical to electrical energy: a dry cell

9. By giving examples, explain how sun is the ultimate source of energy on earth.

Ans. The plants trap solar energy in the form of chemical energy which is then converted to coal/fuels and these give heat energy on burning. The heat energy is used in thermal power plants and then converted into electrical energy. Electrical energy can then be converted into any other form of energy. Thus sun is the ultimate source of energy.

10. State the differences between energy and power.

Ans.

ENERGY	POWER
Capacity to do work.	Rate of doing work.
It does not depend on time.	It depends on time.
SI unit is Joule.	SI unit is Watt.

A.Objective Questions

1. Write true or false for each statement

(a) A coolie does no work against the force of gravity while carrying a luggage on a road.
Answer. True.

(b) The energy stored in water of a dam is the kinetic energy.
Answer. False.
The energy stored in water of a dam is the potential energy.

(c) The energy of a flying kite is kinetic energy.
Answer. True.

(d) Work done by a boy depends on the time in which he does work.
Answer. False.

(e) Power spent by a body depends on the time for which it does work.
Answer. True.

2. Fill in the blanks

(a) Work is said to be done by a forte only when **the body moves.**
(b) Work done = Force × **distance moved in direction of force.**
(c) The energy of a body is its capacity to do **work.**
(d) The S.I. unit of energy is **joule.**
(e) The potential energy of a body is due to its **state of rest or position** and kinetic energy of body is due to its **state of motion.**
(f) Gravitational potential energy U = mass × force of gravity on unit mass × **height.**
(g) Kinetic energy = 1/2 × mass × **(speed)²**
(h) Power P=**work done**/time taken.
(i) The S . i. unit of power is **watt**
(j) I H.P. = **746 W**

3. Match the following

Column A	Column B
(a) A stone at a height	**(i) power**
(b) A moving ball	**(ii) joule**
(c) Energy	**(iii) work done in 1 s**
(d) Power	**(iv) potential energy**
(e) watt	**(v) kinetic energy**

Column A	Column B
(a) A stone at a height	(iv) potential energy
(b) A moving ball	(v) kinetic energy
(c) Energy	(ii) joule
(d) Power	(iii) work done in 1 s
(e) watt	(i) power

4. Select the correct alternative

(a) The S.I. unit of work is

1. second
2. metre
3. **joule**
4. newton

(b) No work is done by a force if the body

1. moves in direction of force
2. **does not move**
3. moves in opposite direction
4. none of the these

(c) Two coolies A and B do some work in time 1 minute and 2 minute respectively. The power spent is

1. same by both coolies
2. **is more by coolie A than by B**
3. is less by coolie A than by B
4. nothing can be said.

Answer:
Two conditions are :
(i) There should be no displacement i.e. S = 0
(ii) The displacement is NORMAL to the direction of FORCE
i.e. – θ = 90°

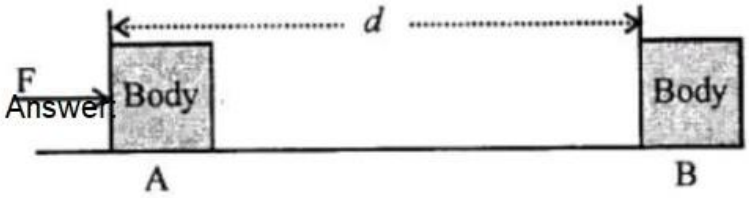
Question 4.
In which of the following cases is work being done :
(a) A boy pushing a rock
(b) A boy climbing up the stairs
(c) A coolie standing with a box in his head
(d) A girl moving on the road.
Answer:
(b) A boy climbing up the stairs
(d) A girl moving on the road.

Question 5.
A coolie is moving on a road with a luggage on his head. Does he perform work against the force of gravity ? Give reason for your answer.
Answer:
A coolie carrying a luggage on his head moving on ground does i no work against the force of gravity as displacement is normal to the direction of force of gravity.

Question 6.
The moon is revolving around the earth in a circular path. How much work is done by the moon ?

No work is done, since displacement is NORMAL to the direction | of force on the body. The force is CENTRIPETAL.

Question 7.
Write the expression for work done by a force,
Answer:
Work done by applying force F is the product of force applied on the body and distance moved by the body in the direction of force , work done = Force x distance moved in the direction of force.
W = F × d



Answer:

Question 8.
State the S.I. unit of work and define it.
Answer:
S.I. unit of work is Joule
Joule "Is that much work done when a force of IN displaces the body through a distanc of Im in the direction of force."

Question 9.
State two factors on which the work done on a body depends.
Answer:
Two factors are :
(i) Magnitude of force applied (F).
(ii) Distance moved by the body in the direction of force (d) or (5)

Question 10.
Define the term energy.
Answer:
ENERGY : "Capacity of doing work" is called ENERGY

Question 11.
State the S.I. unit of energy.
Answer:
S.I unit __ is Joule (J).

Question 12.
Define 1 joule of energy.
Answer:
Joule "is the capacity of a body to work of 1 J irrespective of time taken."

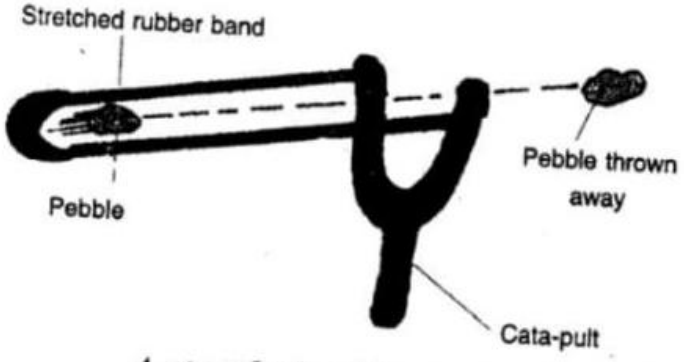
Question 13.
How is work related to energy ?
Answer:
RELATION BETWEEN WORK AND ENERGY : "Energy is the capacity of doing work"
Every form of energy → is work.
i.e. work done on body is STORED IN THE FORM OF ENERGY. ENERGY is spent when a body does work.
Thus to do more amount of work-more energy is needed.

Question 14.
What are the two kinds of mechanical energy ?
Answer:
Two KINDS OF MECHANICAL ENERGY :
(i) The Potential energy (P.E.)

(ii) The Kinetic energy (K.E.)
(ii) The Kinetic energy (K.E.)

Question 15.
What is potential energy ? State its unit.
Answer:
POTENTIAL ENERGY : (P.E. or U)
"The energy possessed by a body due its position above the ground . or change in state."
UNIT : Unit of P.E. = S.I. UNIT OF ENERGY = Joule (J)

Question 16.
Give one example of a body that has potential energy, in each of the following :
(a) due to its position at a height,
(b) due to its elongated stretched state.
Answer:
(a) P.E. due to its position at a height :
Water at a height has P.E. stored in it. Falling water from a height can be used to do work like turning a wheel,
(b) P.E. due to its elongated stretched state :
A stretched rubber band (elongated state) has potential energy. It does work in restoring itself to its original state. A pebble placed on the stretched rubber catapujt, is thrown away when it is released to restore its original state.



A stretched rubber catapult has the potential energy

Question 17.
State two factors on which the potential energy of a body at a certain height above the ground depends.
Answer:
Potential energy = mgh
∴ P.E. = m × h × g '
g' is constant depends upon m and h
Two factors on which P.E. depends :

(i) Mass : greater the mass, greater is P.E.
(ii) HEIGHT ABOVE THE GROUND : Higher the height of body, greater is the P.E.

Question 18.
Two bodies A and B of masses 10 kg and 20 kg respectively are at the same height above the ground. Which of the two has greater potential energy ?

Answer:

Body A	Body B
$P.E_1 = m_1gh$	$P.E_2 = m_2gh$
$P.E_1 = 10 \times gh$	$P.E_2 = 20 \times gh$

As g is constant and h is same in both the cases
Pe_2 is greater than PE.
Hence, Potential energy of body B (more mass) is greater than the P.E. of body A.
Or
As height of body A and is same and 'g' is constant, the body with greater mass i.e. body B has greater potential energy.

Question 19.
A bucket full of water is on the first floor of your house and another identical bucket having same quantity of water is kept on the second floor. Which of the two has greater potential energy ?
Answer:
As 'g' is constant in both cases and quantity of water (m) is same in both cases potential energy depends on height. Since height of second bucket kept at second floor is greater. Hence, second bucket at second floor has greater P.E.

Question 20.
Write the expression for the gravitational potential energy explaining the meaning of the symbols used.
Answer:
EXPRESSION FOR GRAVITATIONAL POTENTIAL ENERGY: P.E. = U = mgh
Where U is gravitational potential energy m is the mass of body.
g is___ force of gravity on mass of 1 kg
mg___ is the force acting on body
h___ is the distance or height moved above the ground level.

CHAPTER 6 HEAT TRANSFER

1.(a)Define boiling and evaporation and differentiate between them.

Ans. a) Boiling: the change of liquid into gas at a fixed temperature is called boiling.

b) Evaporation: the change of liquid into gas at any temperature below its boiling point is called as evaporation.

BOILING	EVAPORATION
1.During boiling, a liquid change into a gaseous state at a constant temperature, called its boiling point.	1.During boiling, a liquid change into a gaseous state at any temperature below its boiling point.
2.This process needs an external source of heat energy.	2.This phenomenon does need an external source of heat energy.
3.It is a bulk process.	3.It is a surface process.
4.Boiling does not cause cooling.	4.Evaporation causes cooling.

2.a) Thermal expansion: the expansion produced in matter due to absorption of heat energy is called thermal expansion.

b) Linear expansion: The expansion in the length of a solid rod or wire on heating is called linear expansion.

c) Superficial expansion: The expansion in area of a surface due to absorption oh heat energy is called superficial expansion.

d) Cubical expansion: The expansion in volume of substance on heating is called cubical expansion.

3. Why do liquids and gases have no linear or superficial expansion?

Ans. This is because intermolecular space is more and intermolecular force of attraction is relatively less so fluids do not have definite shape and hence no definite length or area and no linear and superficial expansion.

5. What is bimetallic strip? Why does a bimetallic strip of brass and iron bend on melting?

Ans. Plates of two different metals which are riveted together at number of points in such a way that they cannot slide on being heated or cooled, form a bimetallic strip. On heating it bends with the metal on outer side which expands more. In a bimetallic strip of brass-iron on heating brass expands more than iron. This unequal expansion bends the strip.

7. a) Why are gaps left in between rails, while laying a railway line?

Ans. Rails are made of steel, which expand on heating and contract on cooling. If rails are fixed tightly, leaving no space for expansion or contraction then these will bend with the change of season. This in turn will result in the derailment of train. To avoid such situations, small gaps are left in between rails and the rails are joined by fish plates. Thus in summer these gaps get smaller and in winter bigger, but the rail itself remains straight. Hence the derailment can be avoided.

b) Why are electric transmission lines kept slightly loose, when they are laid in summer?

Ans: Electric transmission lines are made of aluminium which expands in summer and contracts in winter. If these cables are fixed tightly between the poles in summer then they are very likely to snap in winter due to contraction. Thus they are kept slightly loose so as to allow for contraction in winter.

c) Why is concrete floor made in small slabs rather than a single block?

Ans. Concrete floor expands during summer. As there will not be any space for expansion, therefore, it will crack. Hence to avoid this situation, a floor is laid in small blocks leaving a space in between the blocks. This, in turn, allows for expansion, and hence, the floor does not crack.

d) Why are iron bridges mounted on steel rollers?

Ans. Iron bridges expand in summer and contract in winter. Therefore it would break the supporting pillars if fixed rigidly and the bridge can fall. So the iron girders are mounted on rollers leaving a small space in between for the expansion and contraction. Thus , the bridge is saved from a possible collapse.

(e)Why a small gap left behind the walls while mounting a girder for roofing?

Ans. Small gap left behind the walls while mounting a girder for roofing so as to allow for expansion in summer and contraction in winter.

f) Why does a thick glass tumbler crack when hot liquid is poured into it?

Ans. When hot boiling water is poured into a thick glass tumbler then the inner surface of the tumbler expands immediately. But the outer surface cannot expand simultaneously as this

heat cannot pass outside due to glass being a bad conductor of heat. So due to uneven expansion of inner and outer surfaces,a strain builds up in the glass. It is this strain which cracks the glass.

g) Why does a pyrex glass not crack when boiling hot tea is poured into it?

Ans: Pyrex is a special kind of glass which neither expands more on heating nor contracts more on cooling. Therefore the shape of pyrex glass remains unchanged evenwhen hot tea is poured into it. So it does not crack.

h) Why is the diameter of an iron tyre kept slightly smaller than the wooden wheel on which this tyre is to be mounted?

Ans: As the iron tyre is slightly smaller in diameter than the wooden wheel, it can't be mounted on the wheel. But the iron tyre is heated to a red hot temperature so that it expands and its diameter increases and becomes more than that of the wheel. This makes the iron tyre to slip on the wooden wheel easily. Now cold water is poured so that the iron tyre contracts and holds the wooden wheel very tightly.

8. What is rivet? How are two metal plates joined by rivet?

Ans. A small steel or iron cylinder used for fastening two metal plates is known as a rivet.

A hole is made between two metal plates, which are to be joined to form a single plate. A rivet is chosen such that the length of rivet is slightly smaller than the thickness of metal plates. The rivet is heated to red hot temperature so that it expands and its length becomes slightly more than the total thickness of two plates. This hot expanded rivet is then inserted in the hole between the metal plates. It is then hammered so as to flatten its ends. On cooling the rivet contracts and holds the metal plates very tightly.

INSIDE QUESTIONS

A. Objective Questions

1. Write true or false for each statement

(a) Evaporation is rapid on a wet day.
Answer. False.

(b) Evaporation takes place only from the surface of liquid.
Answer. True.

(c) All molecules of a liquid take part in the process of evaporation.
Answer. False.

(d) Temperature of a liquid rises during boiling or vaporization
Answer. False.

(e) All molecules of a liquid take part in boiling.
Answer. True.

(f) Boiling is a rapid phenomenon.
Answer. True.

(g) All solids expand by the same amount when heated to the same rise in temperature.
Answer. False.

(h) Telephone wires are kept tight between the two poles in winter.
Answer. True.

(i) Equal volumes of different liquids expand by the different amount when they are heated to the same rise in temperature.
Answer. True.

(j) Solids expand the least and gases expand the most on being heated.
Answer. True.

(k) A mercury thermometer makes use of the property of expansion of liquids on heating.
Answer. True.

(l) Kerosene contracts on heating.
Answer. False.

2. Fill in the blanks

(a) Boiling occurs at **a fixed temperature.**
(b) Evaporation takes place at **all temperature.**
(c) The molecules of liquid **absorb** heat from surroundings in evaporation.
(d) Heat is **absorbed** during boiling.
(e) Cooling is produced in **evaporation.**
(f) A longer rod expands **more** than a shorter rod on being heated to the same temperature.
(g) Liquids expand **more** than the solids.
(h) Gases expand **more** than the liquids.
(i) Alcohol expands **more** than water.
(j) Iron expands **less** than copper.

3. Match the following

Column A	Column B
(a) Blowing air increases	**(i) increase in inter-molecular separation**
(b) Increase in pressure increases	**(ii) pendulum of a clock**
(c) Thermal expansion	**(iii) cooking utensils**
(d) Invar	**(iv) boiling point**
(e) Pyrex glass	**(v) evaporation**

Column A	Column B
(a) Blowing air increases	(v) evaporation
(b) Increase in pressure increases	(iv) boiling point
(c) Thermal expansion	(i) increase in inter-molecular separation
(d) Invar	(ii) pendulum of a clock
(e) Pyrex glass	(iii) cooking utensils

4. Select the correct alternative

(a) In evaporation

1. all molecules of liquid begin to escape out
2. **only the molecules at the surface escape out**
3. the temperature of liquid rises by absorbing heat from surroundings.
4. the molecules get attracted within the liquid.

(b) The rate of evaporation of a liquid increases when :

1. temperature of liquid falls

2. liquid is poured in a vessel of less surface area
3. **air is blown above the surface of liquid**
4. humidity increases.

(c) During boiling or vaporization

1. **all molecules take part**
2. temperature rises
3. no heat is absorbed
4. the average kinetic energy of molecules increases.

(d) The boiling point of a liquid is increased by

1. increasing the volume of liquid
2. **increasing the pressure, on liquid**
3. adding ice to the liquid
4. decreasing pressure on liquid.

(e) Two rods A and B of the same metal, but of length 1 m and 2 m respectively, are heated from 0°C to 100°C. Then

1. both the rods A and B elongate the same
2. the rod A elongates more than the rod B
3. **the rod B elongates more than the rod A**
4. the rod A elongates, but the rod B contracts.

(f) Two rods A and B of the same metal, same length, but one solid and the other hollow, are heated to the same rise in temperature.
Then

1. the solid rod A expands more than the hollow rod B
2. the hollow rod B expands more than the solid rod A
3. the hollow rod B contracts, but the solid rod A expands
4. **both the rods A and B expand the same.**

(g) A given volume of alcohol and the same volume of water are heated from the room temperature to the same temperature then.

1. alcohol contracts, but water expands
2. water contracts, but alcohol expands
3. water expands more than alcohol
4. **alcohol expands more than water.**

(h) The increase in length of a metal rod depends on

1. the initial length of the rod only
2. the rise in temperature only
3. the material of rod only
4. **all the above three factors.**

(i) The correct statement is

1. Iron rims are cooled before they are placed on the cart wheels.
2. A glass stopper gets tighten on warming the neck of the bottle.
3. Telephone wires sag in winter, but become tight in summer.
4. **A little space is left between two rails on a railway track.**

B. Short/Long Answer Questions

Question 1.

What is matter ? What is it composed of

Answer:

MATTER: Anything around us is a matter.
"Anything that has mass, occupies volume and can be felt by our senses."
It is composed of'molecules'.

Question 2.

Name the three states of matter and distinguish them on the basis of their (i) volume, and (ii) shape

Answer:

THREE STATES OF MATTER:
(i) SOLID (ii) LIQUID (iii) GASEOUS
DISTINCTION BETWEEN THREE STATES ON THE BASES OF .
(i) VOLUME:
SOIDS : have least volume.
LIQUIDS: have definite volume.
GASES: have maximum volume.
(ii) SHAPE:
SOLDIS: Have definite shape.
LIQUIDS : Have no definite shape.
GASES : Have no definite shape.

Question 3.

Distinguish between liquid and vapour (or gas) states of matter on the basis of following factors
(a) Arrangement of molecules
(b) Inter-molecular separation
(c) Inter-molecular force, and
(d) Kinetic energy of molecules

Answer:

Ans. DISTINCTION BETWEEN LIQUID AND VAPOUR ON THE BASES OF:

	LIQUID	VAPOUR
(a) Arrangement of molecules	Closely packed	Very losely packed
(b) Inter molecular separation	Least	Maximum
(c) Inter molecular force	Maximum	Least
(d) Kinetic energy of molecules	Least	Maximum

Question 4.
What is evaporation ? Explain it on the basis of molecular motion.
Answer:
EVAPORATION : "The change of liquid into its vapours at all temperature from its surface is called evaporation."
EXPLANATION OF EVAPORATION on the bases of molecular motion:
Molecules of liquid have more spaces, less molecular force of attraction and more K.E. than molecules of solids and can move through out the liquid.
While moving they can not escape the surface as they are being pulled inside by other molecules as there are no molecules above the surface. But when some molecules acquire sufficient K.E. (Threshold velocity), they over come the ATTRACTIVE FORCES of other molecules and escape into the open space above the liquid. These escaping molecules form the vapour of the liquid and the process called Evaporation continues till all the liquid evaporates.

Question 5.
Do all the molecules of a liquid take part in evaporation ? If not, explain your answer.
Answer:
No, all tne molecules of the liquid do not take part in evaporation only those molecules near the surface of liquid which acquire sufficient Kinetic energy (Threshold velocity) escape as they over come attractive forces of other molecules. Then other molecules come to the surface of the liquid and acquire more K.E. and escape the surface. This continues till all the liquid evaporates.

Question 6.
No heat is supplied to a liquid during evaporation. How does then the liquid change into its vapours ?

Answer:

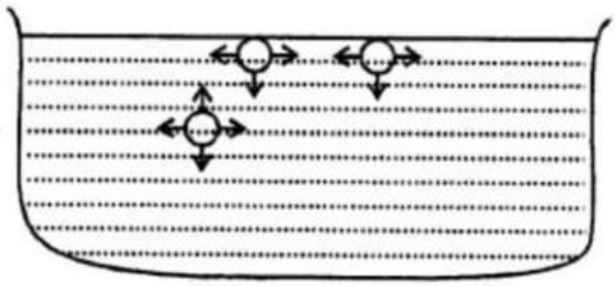
Though no heat is supplied to the liquid but molecules near the surface of the liquid acquire sufficient kinetic energy by collisions with other liquid molecules and with this K.E. they over come the attractive forces of other molecules and change into vapours.

Question 7.

Comment on the statement 'evaporation is a surface phenomenon'.

Answer

Change of liquid into vapours at all temperatures from the surface is called evaporation. Evaporation takes place at surface in those molecules which are at surface and have sufficient K.E. to over come attractive force due to inner surrounding molecules.



Question 8.

Why is cooling produced when a liquid evaporates ?

Answer:

For changing liquid into vapours heat is needed this heat is taken from the container or surroundings and temperature of container or body itself fall and cooling is produced.

Question 9.

Give reason for the increase in rate of evaporation of a liquid when

(a) air is blown above the liquid

(b) surface area of liquid is increased

(c) temperature of liquid is increased.

Answer:

(a) BLOWING AIR ON LIQUID SURFACE INCREASES RATE OF EVAPORATION : Blowing air takes away with it the molecules of liquid escaping out of the surface. To take their place, other molecules escape out from the surface of liquid.

(b) SURFACE AREA INCREASES THE RATE OF EVAPORATION: On increasing the area of the surface, number of molecules escaping out from the surface increases.

(c) INCREASE IN TEMPERATURE INCREASES THE RATE OF EVAPORATION: Increase in temperature increases K.E.

$\left(K.E = \frac{1}{2} Mv^2\right)$. More and more molecules come to the surface of liquid hence the rate of evaporation will increase with increase in temperature.

Question 10.

What is boiling ? Explain it on the basis of molecular motion?

Answer:

BOILING: "The change of liquid to vapours on heating at a constant temperature is called BOILING"

K.E = $\frac{1}{2}$ Mv^2 : more the speed of molecules more is the kinetic energy. Heating of the liquid increases the average K.E. of liquid molecules and molecules acquire sufficient K.E. needed to overcome the force of attraction of other molecules. These molecules start leaving the liquid not only at the surface but also near the walls of the containing vessel and bubbles are seen on the walls of vessel. This causes the agitation in the whole of the liquid and this is called boiling.

Question 11.

Why does bubbles appear when a liquid is heated ?

Answer:

When liquid is heated formation of vapours takes place which appear in the form of bubbles.

Question 12.

What is the change in average kinetic energy of molecules of a liquid during boiling at its boiling point ?

Answer:

AVERAGE KINETIC ENERGY is the measure of temperature of body. When temperature of body increases the average kinetic energy increases and when Average Kinetic energy decreases there is decrease of body temperature and hence at boiling point average Kinetic eneigy increases.

Question 13.

How is the heat energy supplied to a liquid used during boiling at a fixed temperature ?

Answer:

When heat is supplied, temperature of liquid rises continuously till the water starts boiling at 100°C. Once the water starts boiling, its temperature does not rise further, although heat is still being supplied. This heat is being used to change each and every water molecule into vapour.

Question 14.

Name two ways of change of liquid state to the vapour state and distinguish them.

Answer:

Two ways of change of liquid state to vapour state are:

(i) Evaporation

(ii) Boiling.

CHAPTER 7: SOUND

STUDY QUESTIONS

Q1.Define the following terms used in the study of sound:

(a)Amplitude

Ans: The maximum displacement of a vibrating particle from its mean position is called amplitude.

(b)Frequency

Ans: The number of vibrations produced by a vibrating particle in one second is known as frequency.

(c)Time period

Ans: The time in which a vibrating body completes one vibration is called time period.

Q2.Derive a mathematical relation between the frequency and the time period of a sound wave.

Ans: Let Time period = T seconds

=> time taken to complete one vibration = T second

=> number of vibration in T second = 1

=> number of vibration in 1 second = 1/T

But number of vibrations in one second is frequency =f

Hence f=1/T or T= 1/f

Q3. What name is given to the sound waves of frequency (a) less than 20Hz, (b)between 20Hz to 20000Hz, (c)above 20000Hz.Which waves among the above are not audible to human ear ?

Ans: (a) less than 20 Hz = infrasonic

(b) between 20 Hz to 20000Hz = sonic

(c) above 20000Hz = ultrasonic

Infrasonic waves and Ultrasonic waves are not audible to human ear.

Q4. Name three animals who use ultrasonic waves. Explain atleast one animal which uses ultrasonic waves.

Ans: Dogs, whales, dolphins, bats use ultrasonic waves.

While flying bats emit ultrasonic waves which spread in the atmosphere. On being reflected from an obstacle, the waves are received by the bat. From this bats can know the presence and distance of obstacle, and can fly without colliding.

Q5.(a)Define monotone properly.

Ans: If the pitch, volume, rhythm and timbre of a voice never fluctuate then it is said monotone.

(b)State the unit of loudness and write some loudness level and their effect of sound on human ear.

Ans: The unit of loudness is decibel(dB).

Just audible sound = 10 dB to 25 dB

Comfortable sound = 20 dB to 80 dB

Noise =above 80 dB

Q6.(a)State two laws of reflection of sound.

Ans:(I)Reflection of sound takes place only from hard and polished surfaces.

(ii)The angle of incidence is always equal to the angle of reflection.

(b)Name three different materials which reflect sound.

Ans: Mirrors, metals or hard objects like buildings or stones reflect sound.

(c)Name three different materials which absorb sound.

Ans: Curtains, Carpets and gunny bags absorb sound.

Q7.(a)What do you understand by the term echo?

Ans: The sound heard after reflection from a high-rise building or any distant object when original sound ceases is called an echo.

(b)State two conditions for the formation of an echo.

Ans: The conditions are:

(I)The surface reflecting sound should be rigid and very large surface.

(ii)Minimum distance between source of sound and reflecting body in air is 17m.

(iii)The loudness of the original sound should be sufficient so that it can be heard after reflection.

Q8.(a)What is sonar?

Ans: Sonar is a device fitted in a ship to find the depth of sea.

(b)To what use sonar is put? Explain clearly.

Ans: Sonar is used to find the depth of sea. It is based on the principle of reflection of sound.

From a certain point, ultrasonic vibrations are sent. These vibrations after striking the sea bed, get reflected upward and are picked up at another point. The time in which reflected ultrasound is received is recorded. Knowing the speed of ultrasound in water (1500m/s) and the time taken for the reflected sound to reach sonar, the depth can be calculated.

Q9.(a)What do you understand by the term loudness of sound ?

Ans: Loudness is the characteristics of a sound which distinguishes a feeble sound from a loud sound of the same frequency.

(b)State two physical factors which determine loudness of sound.

Ans: The two physical factors determining loudness of sound are:

(i) loudness increases with the amplitude of the vibrating body.

(ii) loudness increases with the increase in surface area of vibrating body.

Q10.(a)What do you understand by the term pitch of sound ?

Ans: Pitch is the effect produced in the ear due to the sound of some particular frequency. It is due to this property of sound that one can distinguish between a shrill sound and a flat sound.

(b) State one factor which determine pitch of sound.

Ans: Frequency

Q11. What do you understand by the term quality of sound? How is quality imparted to a sound of some particular pitch and loudness?

Ans: The property due to which two notes of the same loudness and same frequency produced by two different bodies can be distinguished is called quality of sound.

The quality of sound is due to the formation of subsidiary notes which are produced due to the vibrations of various parts of musical instruments and their shapes.

INSIDE QUESTIONS

A. Objective questions

1. Write true or false for each statement

(a) When sound propagates in air, it does not carry energy with it.
Answer. False.

(b) In a longitudinal wave, compression and rarefaction are formed.
Answer. True.

(c) The distance from one compression to nearest rarefaction is called wavelength.
Answer. False.

(d) The frequency is measured in second.
Answer. False.

(e) The quality of a sound depends on the amplitude of wave.
Answer. False.

2. Fill in the blanks

(a) The time period of a wave is 2 s. Its frequency is **0.5 S^{-1}.**
(b) The pitch of a stringed instrument is increased by **increasing** tension in string.
(c) The pitch of a flute is decreased by **increasing** length of air column.
(d) Smaller the membrane, **higher** is the pitch.
(e) If a drum is beaten hard, its loudness **increases.**
(f) A tuning fork produces sound of **single** frequency.

3. Match the following

	(a) Amplitude	**(i)**	**frequency**
	(b) Frequency	**(ii)**	**amplitude**
	(c) Loudness	**(iii)**	**maximum displacement on either side**
	(d) Pitch	**(iv)**	**presence of other frequencies**
	(e) Wave form	**(v)**	**1/time period**
Ans.	**Column A**		**Column B**
	(a) Amplitude	(iii)	maximum displacement on either side
	(b) Frequency	(v)	1/time period
	(c) Loudness	(ii)	amplitude
	(d) Pitch	(i)	frequency
	(e) Wave form	(iv)	presence of other frequencies

4. Select the correct alternative

(a) Sound can not travel in

1. solid
2. liquid
3. gas
4. **vacuum**

(b) When sound travels in form of a wave

1. the particles of medium move from the source to the listener
2. the particles of medium remains stationary
3. the particles of medium start vibrating up and down
4. **the particles of medium transfer energy without leaving their mean positions.**

(c) The safe limit of loudness of audible sound is

1. **0 to 80 dB**
2. above 80 dB
3. 120 dB
4. above 120 dB

(d) The unit of loudness is

1. **cm**
2. second
3. hertz
4. decibel

(e) In a piano, pitch is decreased by

1. **using thicker string**
2. increasing tension
3. reducing length of string
4. striking it hard Ans.

B. Short/Long Answer Questions

Question 1.

How does sound travel in air ?

Answer:

A periodic disturbance in the medium (Air) is created by the vibration of sound and the particles of the medium vibrate about their mean position and transfer of energy in the form of sound waves takes place, i.e. in the LONGITUDINAL WAVES.

Question 2.

What is longitudinal wave ?

Answer:

Longitudinal wave: The wave in which the particles of the medium vibrate about their mean positions in the direction of propagation of sound is called longitudinal wave. Such a wave can be produced in solids, liquids as well as gases.

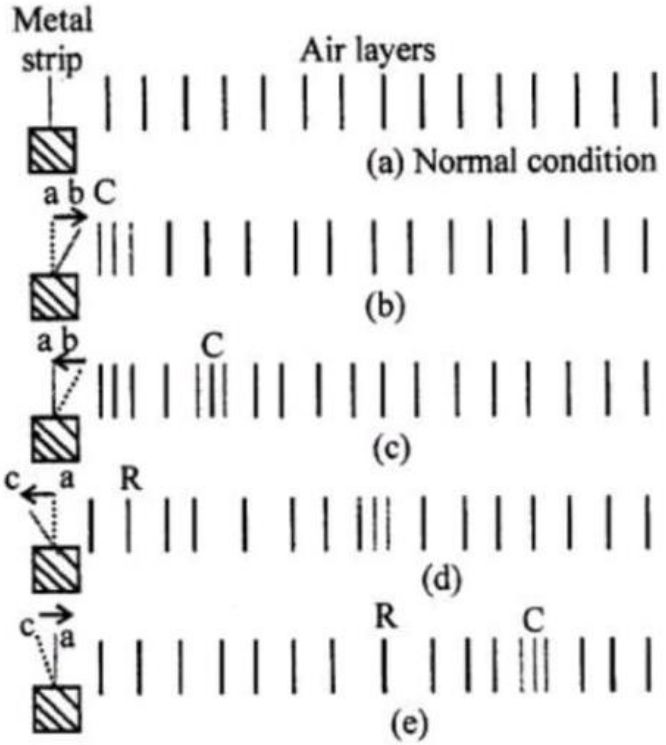
Question 3.

Explain the mechanism of formation of a longitudinal wave when source vibrates in air.

Answer:

PROPAGATION OF SOUND IN AIR : When a source of sound vibrates, it creates a periodic disturbance in the medium near it (i.e., the condition of medium changes). The disturbance then travels in the medium in form of waves. This can be understood by the following example.

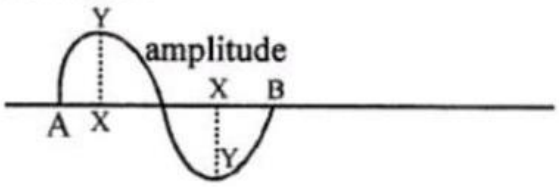
Example: Take a vertical metal strip with its lower end fixed. Push its upper end to one side and then release it. As it vibrates, i.e. moves alternately to the right and left, sound is produced. Figure shows the steady (or mean position) of the metal strip and normal condition of air layers near the strip.



As the strip moves to the right from a to b in Figure it pushes the particles of air layer in front of it. So the particles of air in this layer come closer to each other i. e., air in that layer gets compressed (or compression is formed at C). The particles of this layer while moving towards right, pushes and compresses the layer next to it, which then compresses the next layer and so on. Thus the disturbance moves forward in form of

compression. The particles of the medium do not move with the compression.
As the metal strip starts returning from b to a in Figure after pushing the particles near the strip, the compression C moves forward and the particles of air near the strip return back to their normal positions due to the elasticity of the medium.
When the strip moves to the left from a to c in Figure it pulls the layer of air near it towards left and thus produces a space of very low pressure on its right side. The air layers on the right side of the strip expands in this region thus forming the rarefied layers. 'This region of low pressure is called a rarefaction R.
By the time the strip returns from c to its mean position a in Figure the rarefaction R moves forward and air layers near the strip return back to their normal position due to the elasticity of the medium.
In this manner, as strip moves to the right and left repeatedly, the compression and rarefaction regions are produced one after the other which carry the disturbance along it with, definite speed depending on the nature of the medium.
One complete to and fro motion of the strip forms one compression and one rarefaction which together constitute one wave. This wave in which the particles of the medium vibrate about their mean positions, in the direction of propagation of sound, is called the longitudinal wave. Thus sound travels in air form of longitudinal waves. Actually the longitudinal waves can be produced in solids, in liquids as well as in gases.
Thus, due to propagation of wave in a medium, the particles of the medium vibrate about their mean positions (without leaving their positions) and they transfer the energy with a constant speed from one place of medium to the other place.

Question 4.
Define the following terms :
(a) Amplitude
(b) Frequency
(c) Time period.
Answer:
(a)Amplitude (A) : The maximum displacement of a wave on either side of its mean position is called Amplitude A = XY = is amplitude.
(b) Frequency (f) or n
Number of oscillations made by a wave in one second is known as its frequency.
(c) Time Period (T): Time taken to complete one vibration is called Time Period, i.e. from A to B



Question 5.
Obtain relationship between the time period and frequency.
Answer:
RELATIONSHIP BETWEEN THE TIME PERIOD (T) and FREQUENCY (*f*): By

Question 6.

Name three characteristics of a musical sound.

Answer:

CHARACTERISTICS OF SOUND

Sounds can be distinguished from one another by the following three different characteristics:

(i) loudness

(ii) pitch or shrillness, and

(iii) quality or timbre.

Question 7.

Name the quantity from below which determines the loudness of a sound wave :

(a) Wavelength

(b) Frequency, and

(c) Amplitude.

Answer:

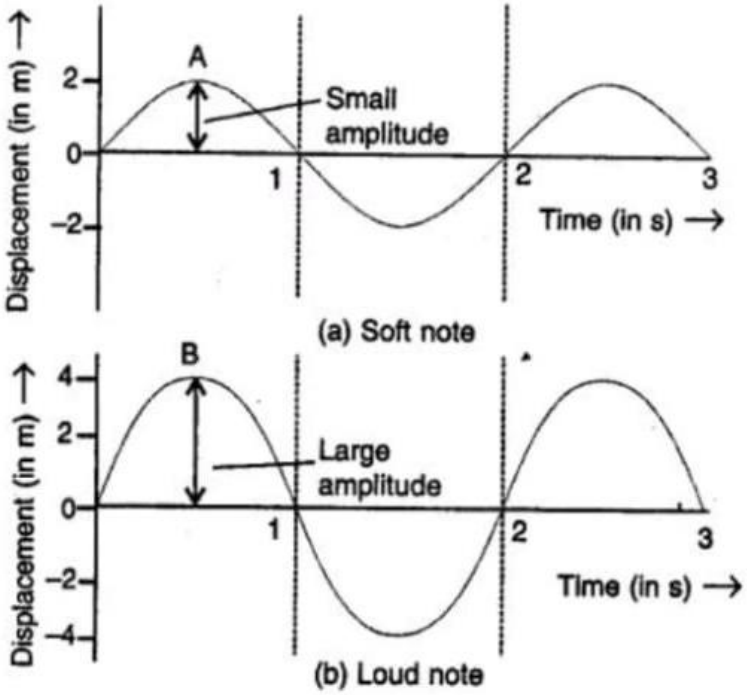
Quantity which determines loudness of a sound wave is (c) AMPLITUDE.

Question 8.

How is loudness related to the amplitude of wave ?

Answer:

Greater the amplitude, greater is the loudness.



Soft and loud sound

If we strike the drum gently, a faint sound is heard. But if we strike it hard, a loud sound is heard.

Question 9.

If the amplitude of a wave is doubled, what will be the effect on its loudness ?

Answer:

The loudness of sound is directly proportional to the sequare of amplitude of wave.
Loudness α (amplitude)^{2}When amplitude is doubled loudness becomes (2)^2 = 4 times

Question 10.

How does the wave pattern of a loud note differ from a soft note ? Draw a diagram.

Answer:

The amplitude of soft note (faint) has smaller amplitude.
The amplitude of loud sound has niore amplitude as shown in figure of Ans. 8.

Question 11.

Name the unit in which the loudness of sound is expressed.

Answer:

Unit of loudness _____ decible(dB)

Question 12.

Why is the loudness of sound heard by a plucked wire increased when mounted on a sound board ?

Answer:

A wire mounted on a sound board is plucked, the surface area of vibrating air increases and sends forth greater amount of energy, So the amplitude of vibration is large and louder is the sound.

Question 13.

State three factors on which loudness of sound heard by a listener depends.

Answer:

THREE FACTOR FOR LOUDNESS OF SOUND :

(i) Surface area of sounding body. i.e. is directly proportional to surface area of vibrating body.

(ii) On the distance of source of sound, i.e. decreases with distance.

(iii) On AMPLITUDE OF WAVE: i.e. increases with amplitude.

Question 14.

What determines the pitch of a sound ?

Answer:

FREQUENCY/.e. number of vibrations per second determines the pitch. Higher frequency, higher pitch means shrill sound. A ' low pitch has flat sound.

Question 15.

Name the characteristic of sound related to its frequency.

Answer:

Characteristic of sound related to its frequency is PITCH.

Question 16.

Name and define the characteristic which enables one to distinguish two sounds of same loudness, but of different frequencies, given by the same instrument.

Answer:

Two sounds of same loudness (amplitude) of different frequencies given by same instrument can be distinguished by the characteristics called PITCH.

Question 17.

Draw a diagram to show the wave pattern ofhigh pitch note and a low pitch note, but of the same loudness.

Answer:

PATTERN OF LOW PITCH AND HIGH PITCH NOTE :

LOW PITCH NOTE:

CHAPTER 8: ELECTRICITY

UNIT 1:STUDY QUESTIONS

Q1.(a)What kind of charges are produced on the glass rod and the silk, when rubbed with each other.

Ans: Glass rod-positive

Silk-negative

(b)State the charges present on the ebonite rod and the cat's skin on rubbing with each other.

Ans: Ebonite rod-negative

Cat's skin-positive

Q3. Briefly describe Rutherford's structure of atom.

Ans: An atom consists of three sub atomic particles, i.e. neutrons, protons and electrons.

-neutrons has no electric charge on it. It has a mass almost equal to mass of one atom of hydrogen.

-proton has a unit positive charge on it. It has a mass almost equal to mass of one atom of hydrogen.

-electron has a unit negative charge on it. Its mass is 1/1837 times the mass of one atom of hydrogen.

The protons and neutrons are packed together to form the central hard core of the atom known as nucleus of the atom. Electrons revolve around the nucleus in respective orbits. The number of protons in the nucleus is equal to the number electrons in the orbits.

As the total positive charge due to all the protons is equal to the total negative charge due to all the electrons, the net charge of an atom remains zero.

Q4. On the basis of electron transfer, explain, why a glass rod gets positively charged on rubbing with silk.

Ans: When a glass rod is rubbed with silk, then some free electrons from glass rod are transferred to silk. As glass rod develops a deficiency of electrons it gets positively charged. The silk after rubbing has excess of electrons, and hence gets negatively charged.

Q5.On the basis of electron transfer, explain, why an ebonite rod gets negatively charged on rubbing with cat's skin.

Ans: When an ebonite rod is rubbed with cat's skin, the some of the free electrons from cat's skin are transferred to ebonite rod. As the cat's skin has deficiency of electrons it gets positively charged. The ebonite rod has an excess of electrons, and hence, gets negatively charged.

Q6.State the mass and charge on:

(I)electron

Ans: mass=1/1837 times the mass of the atom of hydrogen

Charge=negative

(ii)proton

Ans: mass=mass of one atom of hydrogen

Charge= positive

(iii)neutron

Ans: mass=mass of one atom of hydrogen

Charge= neutral

Q7. What are conductors? Define on the basis of atomic model. Give four examples of different classes of conductors.

Ans: A substance, which has a large number of free electrons, such that they start drifting from one end of a substance to the other end, when it is connected to some source of electricity is called conductors.

Example-copper, iron, silver, solution of acids in water.

Q8. What are insulators ? Define on the basis of atomic model. Name six insulators.

Ans: A substance, which has few free electrons, such that they do not easily drift from one end of substance to the other end, when it is connected to some source of electricity is called insulator.

Example-alcohol, ether, benzene, mica, wood, sugar.

UNIT 2 STUDY QUESTIONS

Q1. What is an electroscope ?

Ans: An electroscope is a device used to find whether a body has an electric charge on it or not. Moreover, it is also used to find whether the charged body is positively charged or negatively charged.

Q2. How can you charge gold leaf electroscope positively by conduction ?

Ans: Take an uncharged GLE. And then take a positive charged glass rod and make it to touch the disc of an uncharged GLE, then GLE is having positive charge.

Q3. (a) A negatively charged rod is held close to the disc of a neutral gold leaf electroscope. What kind of charge is produced on the (I)disc (ii)gold leaves ?

Ans:(I)positive (ii)negative.

(b)Name and define the phenomenon due to which disc and gold leaves acquire charge

Ans: It is due to phenomenon of Induction of Charges. Induction is the process due to which an uncharged body gets electrically charged when held near a charged with opposite kind of charge.

Q4. How can you use GLE to detect a charge on the body ?

Ans: To detect the presence of charge in a body by a GLE, one has to use an uncharged GLE.

The body to be tested is brought in contact with the brass disc of this electroscope.

Either of the following two observations may occur.

(1) If the gold leaves diverge then the body touched to the brass disc is said to be a charged body.
(2) If the gold leaves remain unmoved then the body touched to the brass disc is said to be the charged body.

Q5.How can you use GLE to detect the nature of charge on a body ?

Ans: To detect the nature of charge in a body by a GLE, one has to use a GLE with its leaves charged. Let us say the leaves are positively charged. So the leaves are already in a diverging condition.

The body to be tested is brought in contact with the brass disc of this electroscope.

Either of the following two observations may occur.

(1) If the divergence of gold leaves increases then the body touched to the brass disc is said to be a positively charged body.
(2) If the divergence of gold leaves decreases then the body touched to the brass disc is said to be a negatively charged body.

Q6.(a)What is lightning ?

Ans: Lightning is a dazzling bluish white light produced in the clouds.

(b)How do the clouds get electrically charged ?

Ans: Due to the heat of sun, the warm air and water vapor rise up. Similarly, the cold air above sinks down. When the air molecules rub against water molecules or the cold currents of air rub against the hot currents of air, then due to friction the electrons of air get transferred to water molecules or vice versa. When the condensation takes place and clouds are formed, then these clouds have a huge amount of static charges. In this way the clouds get charged.

(c)How does lightning strike a building?

Ans: When a negatively charged cloud passes over a high-rise building, it induces positive charges on the top of the building and negative charges at its base due to electric induction. As the positive charges attract negative charges, the free electrons from cloud start pushing their way through moist air. This forms a sort of conducting path. When these electrons reach the building, suddenly all the charges in cloud flow into the building. Thus an electric discharge passes through the building which is called lightning. The lightning strikes the building with a devastating effect and sets the building on fire.

Q7: What is a lightning conductor? How does it protect a high-rise building?

Ans: A lightning conductor is a safety device installed on the top of a building to safeguard the building from lightning. It is made of copper which is highly good conducting material. The lightning conductor is a copper rod installed on the highest point of the building. Its upper end is given the shape of spikes and projected towards the sky while the lower end is connected to a thick copper strip which runs along the height of building. The lower end of this copper strip is attached to flat copper plate and buried deep inside the earth. When the

lightning strikes on the sharp points of lightning conductor, all the electric discharge from cloud flows into the earth safely without damaging the building.

Q8.(a)(I) What is conventional current ?

Ans: Conventional current flows from the positively charged body to the negatively charged body.

(ii) What is electronic current ?

Ans: Electronic current flows from the negatively charged body to the positively charged body.

(b)State the direction of the above currents in a conductor, stating which end of the conductor is at high potential.

Ans: Conventional current:

The positively charged body is at a higher potential and the negatively charged body is at a lower potential.

Electronic current:

The positively charged body is at a lower potential and the negatively charged body is at a higher potential.

UNIT 3 STUDY QUESTIONS

Q1. Define battery. How are overall emf and resistance related to the emf and resistance of individual cell when connected in series ?

Ans: A combination of cells which acts a source of electricity is called battery. If E is the overall emf of the battery connected by three cells and E1, E2,E3 are the emf of individuals cells.

Then**, $E=E_1+E_2+E_3$**

If r_1,r_2,r_3 are the internal resistance of individual cells then the internal resistance of the battery equal to the sum of the internal resistance of individual cells.

$r=r_1+r_2+r_3$

Q2. Define electric fuse. How is it acted as a safety device in an electric circuit?

Ans: Electric fuse is the safety device in an electric circuit, which melts and breaks the electric circuit, when the current exceeds certain limits.

When some overloading or voltage fluctuation takes place, the fuse wire melts. This in turn breaks the electric circuit and hence current stops flowing in the circuit. Thus in a way, fuse helps in disconnecting an overloaded or faulty electric circuit and hence prevents an electric fire.

Q3. What do you mean by circuit breaker? How is it used in an electric circuit to protect an electric appliance?

Ans: The problem in fuses is that the fuse wire melts, and hence, needs replacement whenever overloading takes place. The problem is overcome in miniature circuit breakers. It is placed in series in a given electric circuit in live wire and switch on. Whenever the circuit gets overloaded, the components in it sense it and put the miniature circuit breaker in off position.

Q4. Define earthing. How is it used in an electric circuit to protect an electric appliance?

Ans: Earthing means that the metal body of the appliance is connected to a thick copper wire, which is buried deep in the earth and its other end is connected to a copper plate surrounded by the mixture of charcoal and common salt.

When an earth appliance gets short circuited, then the current from its metal body flows into the earth. Since the earth does not offer any resistance, therefore magnitude of the current in the circuit of a short-circuited appliance suddenly rises to a very high value. This rise in magnitude of current, in turn overloads the circuit, and hence, the fuse in that circuit melts.

Q5.Describe identification and function of live wire, neutral wire and earth wire in an electric circuit.

Ans:

	OLD CONVENTION	NEW CONVENTION
Live wire	Red	brown
Neutral wire	Black	Light blue
Earth wire	Green	Green or yellow

Q6.How is household energy consumption calculated in kilowatt-hour?

Ans: Electrical energy =power(kilowatt)x time(hours)

$$=\frac{\text{Power(in watt)xTime(in hour)}}{1000}$$

Q7. Explain the dangers of electricity and the safety precautions required.

Ans: Dangers of electricity

*Electric shock

*Short-circuiting

*Fire

Precautions

*Do not touch the switches with wet hands

*Do not put your fingers orany metallic objects in the sockets.

*Do not touch the switches on the main board.

A. Objective Questions

1. Write true or false for each statement:

(a) A fuse wire has a high melting point.
Answer. False.

(b) Flow of protons constitutes electric current.
Answer. False.

(c) Silver is an insulator of electricity.
Answer. False.

(d) S.I. unit and commercial unit of electrical energy are same.
Answer. False.

(e) Overloading of electric current in circuits can lead to short circuiting.
Answer. True.

(f) Our body can pass electricity through it.
Answer. True.

(g) All metals are insulators of electricity.
Answer. False.

(h) The earth wire protects us from an electric shock.
Answer. True.

(i) A switch should not be touched with wet hands.
Answer. True.

(j) AH electrical appliances in a household circuit work at the same voltage.
Answer. True.

(k) In a cable, the green wire is the live wire.
Answer. False.

(l) A fuse is connected to the live wire.
Answer. True.

B. Short/Long Answer Questions

Question 1.
From where does the electricity come to our home ?
Answer:
In our homes electricity comes from the CITY SUBSTATION.

Question 2.
What is an electric meter ? Where is it fixed in our house ?
Answer:
ELECTRIC METER : Is ENERGY meter or kWh meter and measures the amount of electric energy consumed in kWh for which electricity bill is paid.
It is connected through a cable after company fuse on the front or outside wall of the house.

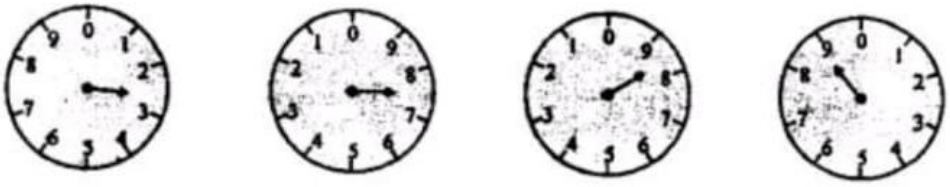
Question 3.
State the purpose of kWh meter.
Answer:
Purpose of kWh meter is to measure the electric energy consumed in kWh for which the electricity bill is to be paid. i.e. units of energy consumed.

Question 4.
For which unit do we pay our electricity bill ?
Answer:
UNIT — is boad of trade unit i. e. kWh = 1000 W used in 1 hour.

Question 5.
How can you check just by seeing the meter whether the electricity is in use or not ?
Answer:
If the electricity is in use, the counter fixed on the armature ofthe meter rotates and reads the number of rotations
(A red mark is seen rotating).

Question 6.

The diagram below in figure shows the reading on the dials of a meter. State what is its reading.



Answer:

The reading 2 7 8 9
is 2 7 8 9

Question 7.

One day the meter reading is found to be 7643 units while next day, it was 7657 units. What is the consumption of electricity in a day ?

Answer:

Final reading 7657 units
Initial reading 7643 units
Consumption of electricity in a day
=Final reading-initial reading
= 7657 – 7643
= 14 units.

Question 8.

A source of potential difference V volt sends current I ampere in a circuit for time t second. Write expressions for
(a) electrical energy supplied by the source, and
(b) electrical power spent by the source.

Answer:

Potential difference V is the work done in moving a unit charge
∴ Work done in moving a charge Q through pot. diff. V = QV
i.e. W = QV
but = Q / t = I Or Q = It
∴ W = VIt
Work done = Electrical energy
(a) :. Electrical energy = VIt is the expression
(b) Power ¡s the rate of doing W

$$P = \frac{W}{t} = \frac{VIt}{t} = VI$$

P = VI is the expression.

Question 9.

Name the unit in which you pay the cost of your electricity bill. How is it related to joule ?

Answer:

UNIT in which the electricity bill is charged is board of TRADE
UNIT = kWh
1 Unit = kWh=3600000 J = 3.6×10^6 J
1 kWh= 3.6×10^6 J

Question 10.

If an appliance of power P watt is used for time t hour. How much electrical energy is consumed in kWh.

Answer:

Power P = $\frac{w}{t}$ = Electrical energy / t
∴ Electrical energy = P × t

Question 11.

What is an electric fuse ? State its purpose in the household electrical circuit.

Answer:

FUSE: "Is a safety device which is used to limit the current in an electric circuit.
PURPOSE OF FUSE IN HOUSE HOLD CIRCUIT : It safe guards the circuit and the appliancesrconnected in the circuit from being damaged if the current in the circuit exceeds the specified value due to voltage fluctuation or short circuiting.

Question 12.

State one property of the material of a fuse wire.

Answer:

Two CHARACTERISTICS OF FUSE WIRE are:
(i) Has LOW MELTING POINT.
(ii) Has HIGH RESISTANCE.

Question 13.

Name the material of a fuse wire.

Answer:

MATERIAL used is an ALLOY of LEAD (50%) and TIN 50% having low M.P. of200°C

Question 14.

Can we use copper wire as a fuse wire ? Give reason.

Answer:

Copper wire cannot be used as a fuse wire since meting point of Cu is higher and resistance is very low and current can flow through it without melting it and without breaking the circuit.