Class – IX
Assignment - Chemistry
Ch – 1 (Matter in Our Surroundings)

Q1 **Define the following:**

(a) Matter – Anything which has mass and occupies some volume is called matter.

(b) Diffusion – The intermixing of two substances by their own is called diffusion.

(c) Rigidity – It means tendency to maintain shape.

(d) Compressibility – It means tendency to decrease volume.

(e) Fluidity – It means tendency to flow.

(f) Melting Point – It means the temperature at which solids melts to become liquid at the atmospheric pressure is called its melting point.

(g) Boiling Point – The temperature at which liquid starts boiling at the atmospheric pressure is called boiling point.

(h) Fusion – Converting solid state into liquid state is called fusion.

(i) Latent heat of fusion – The amount of heat energy which is required to change 1kg of a solid into liquid at atmospheric pressure at its melting point is known as latent heat fusion.

(j) Latent heat of vaporization – The amount of heat energy required to change $1kg$ of liquid to gas at atmospheric pressure at its boiling point.

(k) Sublimation – Converting solid to gas and gas to solid.

(l) Evaporation – Change of liquid into vapours at any temperature below its boiling point is called evaporation.

(m) Humidity – Humidity is the amount of water vapour present in air.

(n) Condensation – Converting gas to liquid is called condensation.

Q2 **Give reasons for the following.**

(a) Solids do not possess the property of diffusion.

In solid state particles have higher forces of attraction. So they can't move freely and have negligible space between them so solid do not possess the property of diffusion.

(b) Kinetic energy of the particles in the gaseous state is quite high.

Because forces of attractions between particles in gaseous state are very less as compared to solids and liquids and gaseous particles can move freely in any direction.

(c) Rate of diffusion increases with the rise of temperature.

As the temperature rises the kinetic energy of particles increase and the particles move faster. Eg. – particles of hot sizzling food move faster and easily reaches us when we are several meters away.

(d) Gases have maximum fluidity and least rigidity.

Gases have maximum fluidity because they have least forces of attraction and flow in any direction. They have least rigidity because they move freely and can flow in any direction.

(e) Solid CO2 is known as dry ice.

CO2 gets converted directly to gaseous state on decrease of pressure without coming into liquid state. This is the reason behind this.

(f) Surgeons often spray some ether on skin before performing minor surgery.

Surgeons often spray ether on the portion of skin before performing minor surgeries because ether has very low melting point. So it evaporates very quickly as a result the temperature of skin because so low that it

becomes num due to this patient not feel much pain when a minor cut is made in the skin to perform surgery.

(g) After a hot sunny day, people sprinkle water on roof or open grounds.

Because it is the large amount of latent heat of vaporization of water helps to cool the hot surface.
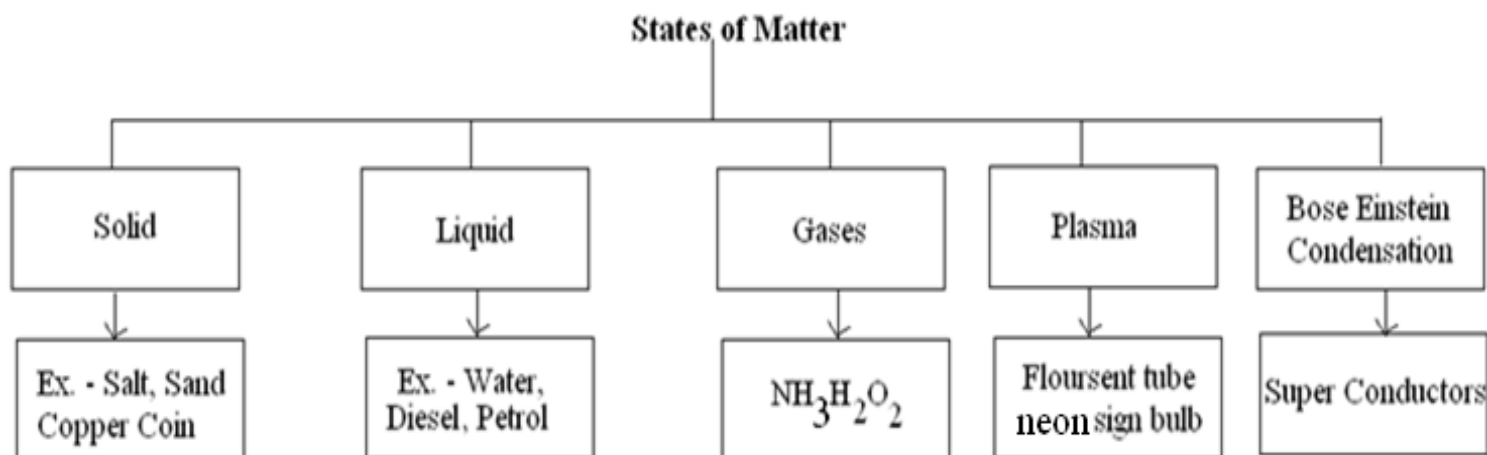
(h) Boiling is a bulk phenomenon.

It is a bulk phenomenon particles of bulk of a liquid change into vapours rate.
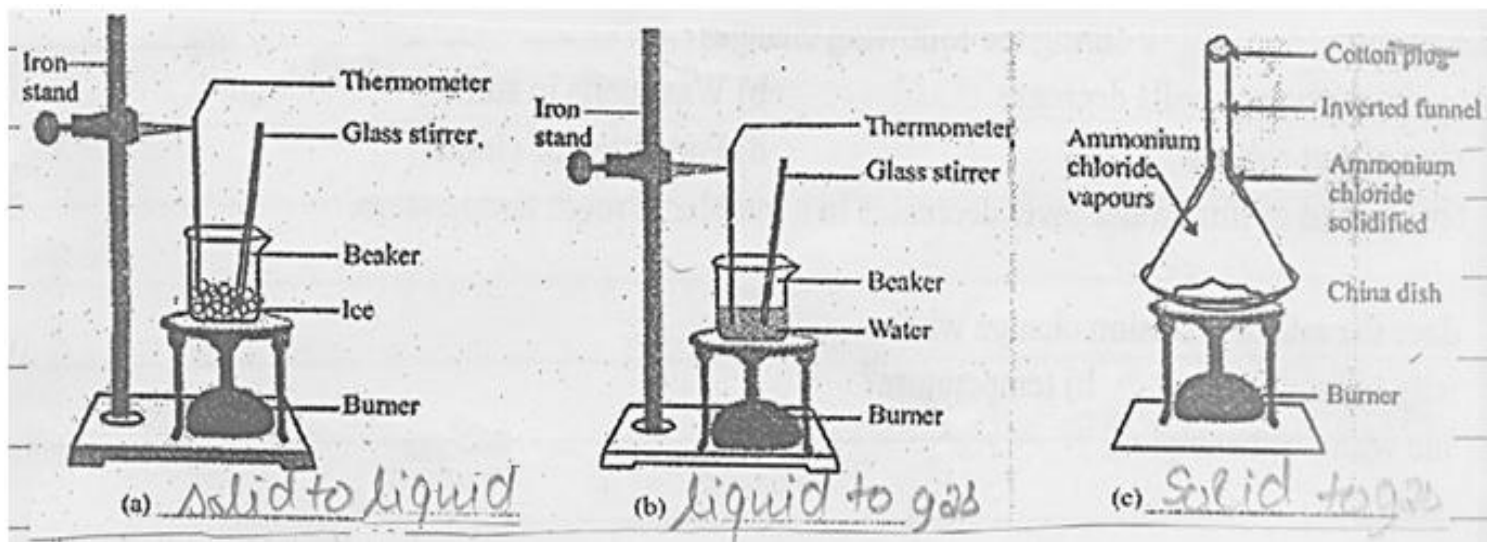
(i) Evaporation is a surface phenomenon.

In case of liquid, a small fraction of particles at the surface having kinetic energy is able to break away from the forces of attraction of other particles and gets converted into vapour. So, evaporation is a surface phenomenon.

Q3   Complete the following chart.

States of Matter

Solid	Liquid	Gases	Plasma	Bose Einstein Condensation
Ex. - Salt, Sand Copper Coin	Ex. - Water, Diesel, Petrol	$NH_3H_2O_2$	Floursent tube neon sign bulb	Super Conductors

Q4   Given below are three figures which illustrate some process. Identify the process.

(a) Solid to liquid   (b) liquid to gas   (c) Solid to gas

Q5   Fill in the blanks.

(a) The forces of attraction between the particles are <u>strongest</u> in solids, <u>stronger than gas but weaker than solid</u> in liquids and <u>weakest</u> in gases.

(b) Rapid evaporation depends on the <u>surface</u> area exposed to atmosphere.

(c) A liquid wets the given surface if <u>adhesive</u> forces are predominant over <u>cohesive</u> forces.

(d) Dry ice is stored under <u>high pressure</u>.

(e) The rate of evaporation of a liquid increases with <u>increase</u> in wind speed.

Q6 **Match the following.**

Column I	Column II
(a) Odonil	(i) Cooling (c)
(b) Number of states of matter	(ii) Sublimate (a)
(c) evaporation causes	(iii) 5 (b)
(d) Least ordered state	(iv) Brownian Movement (e)
(e) Movement of particles	(v) Gas (d)
	(vi) 4
	(vii) Liquid

Q7 **Define rubber foam. Can you compress it, if you can explain. Why?**

Q8 **What are LPG and CNG? Elaborate the two with their specific roles in daily life.**

Q9 **The boiling points of diethyl, acetone and n-butyl alcohol are $56^{o}C$, $118^{o}C$ and $35^{o}C$. Write down their boiling point in K scale.**

Q10 **Define atmospheric pressure.**

Q11 **Suggest two parameters which determine the physical state of matter.**

Q12 **At $0^{o}C$ when ice changes into water on heating, the temperature remains constant? What is this change called?**

Q13 **What is the effect of addition of impurities on the freezing point and boiling point of substance?**

Q14 **When two ice cubes pressed they join together. Can you explain the principle involved.**

Q15 **Which phenomenon occurs during the following changes.**

(a) **Size of naphthalene balls –** Sublimation

(b) **Wax melts insun –** Fusion

(c) **Drying wet clothes –** Evaporation

(d) **Formation of clouds –** Condensation

(e) **After a period of time water level decreases in a tumbler at room temperature –** Evaporation

Q16 **How does the rate of diffusion change with –**

(a) **Density of liquid –** The rate of diffusion decreases.

(b) **Temperature –** The rate of diffusion increases.

Assignment – 2
Matter in Our Surroundings

Q1   List two ways by which a gas can be converted into a liquid.

Q2 CO_2 is a gas. Justify the given statement by two reasons.

Q3   Give reasons for the following:

(a) The temperature of water remains constant during boiling.

(b) Evaporation is a surface phenomenon.

(c) the spaces between the constituent particles are maximum in gases.

Q4   Which gas is called dry ice? Why?

Q5   Convert the following to Celsius scale.

(a) 400K   (b) 373K   (c) 243K   (d) 550K

Q6   Convert the following to Kelvin scale.

(a) 27^oC   (b) 68^oC   (c) 92^oC   (d) 112^oC

Q7   Our of solids, liquids and gases, which one has:

(a) maximum movement of particles

(b) maximum inter particle forces of attraction

(c) minimum spaces in between constituent particles.

Q8   Why are gases so easily compressible whereas it is impossible to compress a solid or a liquid?

Q9   Define the terms:

(a) Latent heat of fusion   (b) Latent heat of vapourisation

Q10   Draw the 'states of matter triangle' to show the interconversion of states of matter.

Q11   A bottle of perfumes was opened in a room. The smell of its vapours spread in the entire room. Name the property of gases which is responsible for this behavior of perfume vapours.

Q12   What is the name of the process in which:

(a) A solid turns directly into a gas?   (b) A gas turns directly in a solid?

Q13   Water as ice has a cooling effect, whereas water as steam may cause severe burns. Explain these observations.

Q14   Nisha had a function at her home. It was to start with a Hawan. Her father told her to bring the material that they had bought from the market two days back. She brought all the material to the Hawan site. It also contained a packet of camphor. To her surprise the camphor packet was empty.

(a) Why did the camphor disappear? What is this property known?

(b) Define this property.

(c) Explain with the help of a diagram how we purify the substance showing this property.

Class – IX
Biology (Chapter - Fundamental Unit of Life)

IMPORTANT DEFINITIONS

1.   Exocytosis : A mode of extracellular transport of cellular secretions, in which secretory vesicles get fused with plasma membrane and their contents are expelled outside the cell.
2.   Flagcllum (PI, Flagella): Microscopic whip-like locomotory protoplasmic extension of the cell surface.
3.   Microtubule: An unbranched, hollow cylindrical assembly of tubulin monomers; forms the structural units of centrioles, basal body, mitotic spindle, cilia and flagella.
4.   Monosaccharide: Simple sugar, not digestible by hydrolysis, e.g., glucose, fructose.
5.   Nucleic acid : Macromolecule or polymer of nucleotides in an unbranched chain; DNA and RNA.
6.   Nucleotide : Monomeric unit of DNA and RNA, each is made up of a phosphate, a pentose (5-carbon) sugar and nitrogen base : adenine, guanine, thymine, cytosine or uracil.
7.   Polymers : A molecule consisting of repeating monomer units linked together.
8.   Polysaccharide :Complex carbohydrate consisting of many monosaccharides bounded together and digestible into these simpler units by hydrolysis, e.g., starch, glycogen.
9.   Secretion : Product or process of cell synthesis in which the molecule acts elsewhere than at its site of origin.
10.   Vesicle : A small spherical membranous element filled with protein in solution.
11.   Xanthophyll : The yellow, red, or orange pigments of green plants.
12.   Aster : Bundle of microtubule fibres radiating out from each cell pole during metaphase.
13.   Centrioles: Two self-replicating, small cylindrical collections of microtubules in the cytoplasm near the nucleus of all animal cells, typically lying at right angles to one another; they organise spindle fibres for cell division.
14.   Cilium : (PI. cilia) : Minute hair-like cellular processes that beat rhythmically on the cell surface and cause movement.
15.   Cristae: Infoldings of the mitochondrial inner membrane towards the matrix (interior) of mitochondria.
16.   Cytokinesis: The division of cytoplasm during cell division.

FACT FILE

- Viruses are exceptions to cell theory.
- Micron(urn) is a unit of length in the CGS system.
- Millimicron (mμ) is a unit of length in SI system.
- Sclerenchymal fibre cells of Manila hemp are over 1 metre in length.
- Nerve cell is the longest sized cell (about 1 metre) of human body.
- **Amoeba** proteus is largest sized unicellular organism.
- ER of muscle is called sarcoplasmic reticulum.
- **Mitochondria** and plastids are semiautonomous organelles and can also self-replicate.
- Diplosome: A pair of centrioles.
- Nucleus is the largest cell structure.
- Prokaryotes have an incipient nucleus called nucleoid.
- Nucleolus is also called little nucleus.
- Diploids (2N) have two sets of chromosomes while haploids (N) have only one set of chromosomes.
- Amphiastral spindle is formed during cell division in animals cells.
- Mitotic apparatus: Both the asters and spindle.
- Mitosis best studied in onion root tip cells in which chromosomes are stained with acetocarmine.
- Homologous pair of chromosomes is formed of one maternal and one paternal chromosome.
- Meiocytes: Cells undergoing meiosis.
- PPLO is the smallest cell, while ostrich egg is the largest cell.
- In an animal cell, plastids are absent.
- A plant cell consists of cellulose cell wall which is absent in animal cells.
- Interphase is most active phase where growth and synthesis occur. It has three substages G_1, Sand G_2.

MULTIPLE CHOICE QUESTIONS

Q1   The organelles that help the cell to use oxygen, and also contain a variety of enzymes that help the cell to degrade rare biochemicals, to produce energy is
(1) lysosomes   (2) peroxisomes   (3) mitochondria   (4) vacuoles

Q2   A semi permeable membrane is stretched across a chamber filled with water. The membrane is only permeable to water. 60 mg of salt is added to the left side of the chamber. Which of the following will happen?
(1) water will move toward the right side   (2) salt will move toward the right side
(3) water will move toward the left side   (4) salt will move toward the left side

Q3   Which of the following could be found in both the nucleus and the cytoplasm
(1) nucleolus   (2) ribosomes   (3) RNA   (4) both RNA & ribosomes

Q4   Amino acid chains built by the ribosomes and then move to the
(1) golgi apparatus   (2) lysosome
(3) endoplasmic reticulum   (4) mitochondria

Q5   A cell that is missing lysosomes would have difficulty doing what?
(1) digesting food   (2) storing energy
(3) packaging proteins   (4) moving cytoplasm

Q6   Which of the following processes causes substances to move across membranes without the expenditure of cellular energy
(1) endocytosis   (2) exocytosis   (3) active transport   (4) diffusion

Q7   The smallest organelle in the cell is
(1) Lysosome   (2) Ribosome   (3) Mitochondria   (4) Peroxisome

Q8   Which of the following statements about the plasma membrane is true -
(1) It is a solid layer of protein that protects the contents of the cell
(2) The plasma membrane of a bacterium has none of the same components as the plasma membrane of an animal cell
(3) It is a solid layer and unmoving layer of phospholipids and proteins
(4) It allows selected molecules

Q9   In eukaryotic cells, which of the following introduces cytoplasmic inheritance?
(1) plastids   (2) mitochondria   (3) lysosome   (4) both (1) and (2)

Q10   Most of the hydrolytic enzymes of lysosomes function at
(1) acid pH   (2) basic pH   (3) neutral pH   (4) both (1) and (2)

Q11 F_1 particles are present in
(1) Nucleus   (2) Chloroplast   (3) Dictyosomes   (4) Mitochondria

Q12   Which of the following organelles is not found in animals cell only?
(1) Peroxisome   (2) Ribosome   (3) Lysosome   (4) Plastid

Q13   Lysosomes are surrounded by how many membrane/s?
(1) One   (2) Two   (3) Three   (4) Four

Q14   All living cell of biological world must have
(1) Cell wall   (2) Mitochondria   (3) Cytoplasm   (4) Plasma membrane

Q15   Osmosis involves diffusion through a semipermeable membrane of
(1) Water from more solute concentration to less solute concentration
(2) Water from less solute concentration to more solute concentration
(3) Water by active transport   (4) None of these

Q16   In the fluid mosaic model of the cell membrane
(1) Lipids are arranged in a single layer
(2) Proteins are represented as islands or icebergs in a lipid sea
(3) Proteins are sandwiched between two layers of lipid
(4) Proteins are arranged in a continuous sheet on the membrane surface.

SHORT ANSWER TYPE QUESTIONS

Q1   What is the protoplasm surrounding the nucleus called?

Q2   Why is ER called cell circulatory.system ?

LONG ANSWER TYPE QUESTIONS

Q1   Give an account of structural organisation of biological membranes.

Q2   Differentiate between:

(a) Cytoplasm and Nucleoplasm

Q3   What is plastid? Define the structure and function of chloroplast and define its significance in photosynthesis?

SUBJECTIVE TYPE SOLVED QUESTIONS

Q1   Name the cell organelle that helps in cell division in animal cells.

Ans.   The cell organelle is centrosome.

Q2   What are peroxisomes? What functions do they perform?

Ans.   They are small membrane bound sacs containing powerful oxidative enzymes. They are mostly found in kidney and liver cells. They carry out the oxidative reactions, which include removal of toxic substances.

Q3   Name the two nucleic acids present in the cell. What are their functions?

Ans.   There are DNA (deoxyribonucleic acid) and RNA (ribonucleic acid).

Functions of DNA: DNA contains genes. Genes are responsible for storing and transmitting the hereditary information to the off springs. DNA is genetic material.

Functions of RNA: It helps in protein synthesis. It is also the genetic material in some viruses.

POSITION OF OBJECT
To describe the location of an object, we specify its position with respect to a fixed point called origin, e.g.
To describe positions of A and B with respect to origin O completely, we must get
(i) Distance of A or B from O.
(ii) Angle, the line OA or OB is making with reference line which is generally x-axis.
    When a body is in motion, its distance from origin or angle made with horizontal line or both can change.
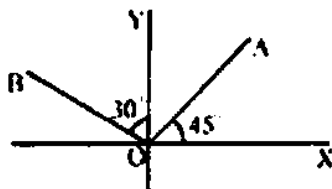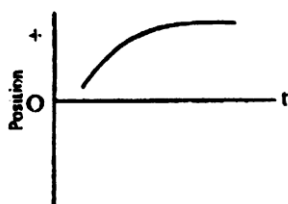

Solve Subjective Questions
Q1   Sketch a position-time graph for an object which is moving with a constant, positive velocity.
Ans.   A position-time graph for an object which is moving with a constant, positive velocity is shown along
       side. A positive, constant velocity is represented by a line with constant slope (straight) and positive
       slope (upwards sloping).
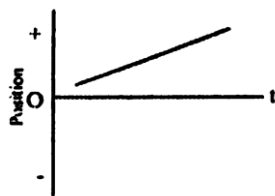
Q2   Sketch a position-time graph for an object moving in the + direction and accelerating from a high
       velocity to a low velocity.
Ans.   A position-time graph for an object moving in the + direction and accelerating from a high velocity to a low
velocity is shown below. If the object is moving in the + direction, then the slope of a p-t graph   would be +. If the
object is changing velocity from high to low values, then the slope must change from   high slope to low slope.

Q3   Sketch a position-time graph for an object moving in the + direction with constant speed; first a slow
       constant speed and then a fast constant speed.
Ans.   A position-time graph for an object moving in the + direction with constant speed; first a slow constant
       speed and then a fast constant speed is shown below. If an object is moving in the + direction, then the
       slope of the line on a p-t graph would be +. At first, the line has a small slope (corresponding to a small
       velocity) and then the line has a large slope (corresponding to a large velocity).
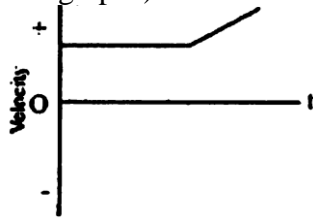

Q4   Sketch a velocity-time graph for an object which first moves with a constant speed in the + direction, and
       then moves with a positive acceleration.
Ans.   A velocity-time graph for an object which first moves with a constant speed in the + direction, and then
       moves with a positive acceleration is shown below. Since there are two parts of this object's motion, there

will be two distinct parts on the graph. Each part is in the + region of the v-t graph (above 0) since the velocity is +. The slope of the first part is zero since constant velocity means zero acceleration and zero acceleration is represented by a horizontal line on a v-t graph (slope =acceleration for v-t graphs). The second part of the graph is an upward sloping line since the object has + acceleration (again, the slope = acceleration for v-t graphs)

Q5   Sketch a velocity-time graph for an object which first moves with a constant speed in the + direction, and then moves with a negative acceleration

Ans.   A velocity-time graph for an object which first moves with a constant speed in the + direction, and then moves with a negative acceleration is shown below. Since there are two parts of this object's motion, there will be two distinct parts on the graph. Each part is in the + region of the v-t graph (above 0) since the velocity is +. The slope of the first part is zero since constant velocity means zero acceleration and   zero acceleration is represented by a horizontal line on a v-t graph (slope = acceleration for v-t graphs).   The second part of the graph is a downward sloping line since the object has – acceleration (again, the   slope = acceleration for v-t graphs)
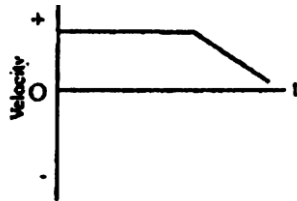
Q6   A girl had designed a clap switch for a science exhibition that enables her to switch on or off an alarm   just with clapping of hands. While testing her device in a hall, she noticed that once the alarm has   sounded it followed with another one due to echo of the clap, that is, the sound reflected by the walls. She   recorded the two soundings of alarm with her tape recorder and found out that time difference in between   them is 0.1 s. If the distance of the wall be 15 m, calculate the speed of sound.

Ans.   Distance covered in going plus coming = 15+ 15= 30 m

Time taken = 0.1 s

So velocity of sound = distance / time = 30 / 0.1. = 300 ms^{-1}.

MULTIPLE CHOICE QUESTIONS

1.   A quantity has a value of-8.0 m/s. it can be said as
      (a) velocity of body   (b) acceleration of body
      (c) speed of body   (d) position of body

2   The area under a graph between two quantities is given in the unit m/s. The quantities are
      (a) speed and time   (b) distance and time
      (c) acceleration and time   (d) velocity and time

3   In the motion of tip of minute hand of a clock, after one hour
      (a) the displacement is zero   (b) distance covered is zero
      (c) average speed is zero   (d) instanteneous velocity is zero

4.   Which of the following is not characteristic of displacement,
      (a) it is always positive   (b) it has both magnitude and direction
      (c) it can be zero
      (d) its magnitude is less than, equal to the actual path length of the object.

5.   Consider the graph shown and decide which of the following is correct ?
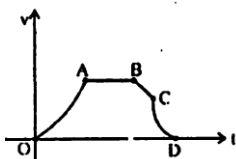
(a) region OA (increasing acceleration), region AB (zero acceleration), region BC (constant acceleration), region CD (decreasing acceleration)

(b) region OA (constant acceleration), region AB (variable acceleration), region BC (zero), region CD (decreasing acceleration)

(c) region OA (decreasing acceleration), region AB (constant acceleration), region BC (zero acceleration), region CD (increasing acceleration)

(d) region OA (constant acceleration), region AB (zero acceleration), region BC (constant acceleration), region CD (variable acceleration).

SHORT ANSWER QUESTIONS

1. Sketch a position-time graph for an object moving in positive direction and accelerating from a low velocity to high velocity.

2. Sketch a position-time graph for an object moving in the negative direction with constant speed, first at fast constant speed and then at slow constant speed.

3. Sketch a position-time graph for an object which moves in the negative direction at a slow constant speed and then in a positive direction at fast constant speed.

4. Sketch a position-time graph for an object moving in the negative direction with constant speed; first at a slow constant speed and then a fast constant speed.

5. An object thrown vertically upwards from top of a building reaches foot in time t_1. It takes time t_2, if thrown vertically down with same velocity. If time of free fall is t, show that $t = \sqrt{t_1 t_2}$.

6. Swati swims in a 90 m pool. She coveres 180min 1minute by swimming from one end to the other and back along a straight path. Find the average speed and average velocity of Swati.

LONG ANSWER QUESTIONS

1. An aeroplane touches down (lands) at a speed of 180km/h and stops after covering a run way of I km. Calculate
   (i) the retardation, and
   (ii) the time in which the plane comes to rest.

2. A train starting from rest, picks up a velocity of 20 m/s in 200 s. It continues to move at the same rate for the next 500 s, and is then brought to rest in another 100 s.
   (i) plot a velocity-time graph.
   (ii) from the graph, calculate :
         (a) the uniform rate of acceleration,
         (b) the uniform rate of retardation,
         (c) the total distance covered before stopping,
         (d) the average velocity over the total journey.

3. A satellite takes 2 h to complete I revolution around the Earth with a speed of 31400 km h^{-1}. Find the radius of the orbit of satellite.

OBJECTIVE

1. Which of the following x-t graphs represent a constant velocity motion?
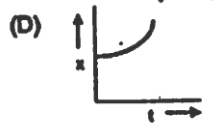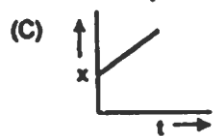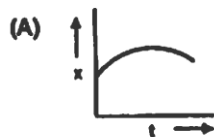
2. From the top of a tower, a stone is thrown up which reaches the ground in time t_1. A second stone thrown down with the same speed reaches the ground in a time t_2. A third stone released from rest from the same location reaches the ground in a time t_3. Then
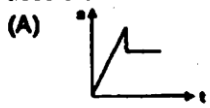
(A) $\dfrac{1}{t_3} = \dfrac{1}{t_1} + \dfrac{1}{t_2}$

(B) $t_3^2 = t_1^2 - t_2^2$

(C) $t_3 = \dfrac{t_1 + t_2}{2}$

(D) $t_3 = \sqrt{t_1 t_2}$

3. A parachutist steps from an aircraft, falls freely for two second, and then opens his parachute. Which of the following acceleration-time (a-t) graphs best represents his downward acceleration a during the first   5 second?

(A)

(B)

(C)

(D)

4. For a moving body, at any instant of time
   (A) if the body is not moving, the acceleration is necessarily zero.
   (B) if the body is slowing, the acceleration is negative.
   (C) if the body is slowing, the distance is negative.
   (D) if the distance, velocity and acceleration at that instant are known, we can. find the displacement at any given time in future.

5. The velocity-time graph of a linear motion is shown in figure. The displacement from the origin after 8 sec, is
   (A) 5 m   (B) 16m   (C)8m   (D) 6m
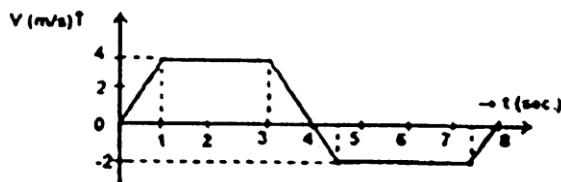
6. A ball is released from the top of a tower of height h metres. It takes T seconds to reach the ground. What is the position of the ball in T/3 second?
   (A) h/9 metres from the ground   (B) 7h/9 metres from the ground
   (C) 8h/9 metres from the ground   (D) 17h/18 metres from the ground

Fill in the Blanks:

7. A stone is thrown vertically upward with an initial velocity v_0, The distance travelled by it in time $\dfrac{4V_0}{3g}$ is _____.

8. Which of the following represents the displacement-time graph of two objects A and B moving with equal velocity?

(A)

(B)


(C)

(D)
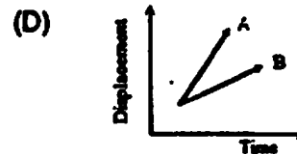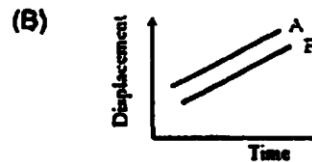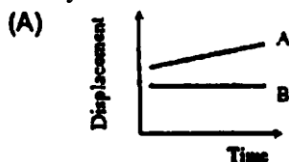
9. A body travels half of its total path in the last second of its free fall from rest. The duration of fall is nearly
   (A) 3.4 sec   (B) 4.5 sec   (C) 5 sec   (D) 5.5 sec

10. An object projected upwards acquires a velocity of 19.6 ms^{-1}, when it reaches half of the maximum height. The maximum height reached is
   (A) 19.6 m   (B) 39.2 m   (C) 78.4 m   (D) 9.8 m
11. Between the two stations a train accelerates uniformly at first, then moves with constant velocity and finally retards uniformly. If the ratio of the time taken be 1 : 8 : 1 and the max. speed attained be 60 km/h then what is the average speed over the whole journey? (Given that initially and finally the train is   at rest)
   (A) 48 km/h   (B) 50 km/h   (C) 54 km/h   (D) 56 km/h
12. The velocity time graphs for two objects A and B are shown. Then the acceleration of A and B are
   (A) 60°, 30°   (B) 30°, 60°   (C) tan 60° , tan 30^0 (D) tan 30°, tan 60°
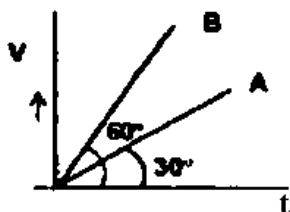
13. A ball is thrown vertically upwards in air. If the air resistance cannot be neglected, then the acceleration of the bail at the highest point is,
   (A) equal to g   (B) greater than g   (C) less than g   (D) equal to zero
14. A ball of mass m_1 and another ball of mass m_2 are dropped from equal height. If time taken by the balls are t_1 and t_2 respectively, then
   (A)$t_1 = \frac{t_2}{2}$ (B)$t_1 = t_2$ (C) $t_1 = 4t_2$ (D) $t_1 = t_2/4$
15. Velocity time graph corresponding to displacement time graph shown in figure is

(A)

(B)

(C)

(D)
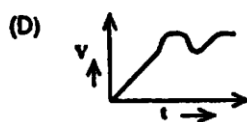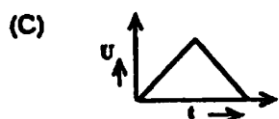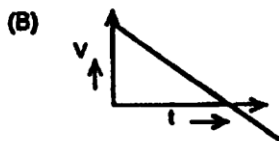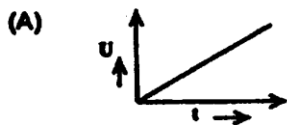
16. Fig. shows the displacement-time curve of the particles P and Q. Which of the following statements is correct?
   (A) Both P and Q move with uniform equal speed.
   (B) P is accelerated Q is retarded.
   (C) Both P and Q move with uniform speed but the speed of P is more than the speed of Q.
   (D) Both P and Q move with uniform speed but the speed of Q is more than the speed of P