DEHRADUN PUBLIC SCHOOL
ASSIGNMENT (2022-23)
SUBJECT – SCIENCE (086)
CLASS - IX

Chapter-1: Matter – Nature and Behaviour

Case-based Type Questions:

Q1. A matter is anything that has mass and occupies space. Pen, paper, clips, sand etc. are different forms of matter. Every matter is made up of small particles. These particles are so tiny that they cannot be seen with naked eyes. There are three states of matter solid, liquid and gas. Solids have a definite shape, distinct boundaries and fixed volumes. Solids may break under force but it is difficult to change their shape, so they are rigid. Liquids have no fixed shape but a fixed volume. Liquids flow and can change shape, so they are not rigid. Gas has indefinite shape and no fixed volume.

Read the passage carefully and answer the following questions:

i. Which of the following is not matter?
   a. Pen
   b. Air
   c. Smell of perfume
   d. None of these

ii. Thoughts coming in our mind are example of matter.
   a. True
   b. False
   c. Can't say
   d. None of these

iii. Which of the following is true about particles of matter?
   a. Particles of matter has spaces between them
   b. Particles of matter are continuously moving
   c. Particles of matter attract each other
   d. All of these

iv. Compressibility is least in case of -
   a. Solid
   b. Liquid
   c. Gas
   d. None of these

v. Which of the following states of matter take shape of container in which it is filled?
   a. Solid
   b. Liquid
   c. Gas
   d. Both b and c

Objective Type Questions:

Q2. The solid which undergoes sublimation is_____.
   a. ice cube
   b. naphthalene
   c. sodium chloride
   d. potassium chloride

Q3. During summer, water kept in an earthen pot becomes cool because of the phenomenon of-
   a. diffusion
   b. transpiration
   c. osmosis
   d. evaporation

Q4. On converting 25°C, 38°C and 66°C to Kelvin scale, the correct sequence of temperature will be
   a. 298 K, 311 K and 339 K
   b. 298 K, 300 K and 338 K
   c. 273 K, 278 K and 543 K
   d. 298 K, 310 K and 338 K

Q5. Assertion(A): Sugar and salt both are easily dissolved in water.
Reason(R): Sugar and salt are solid hence it is easily dissolved in water.
   a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Q6. Assertion(A): Particles in liquid state shows motion.
Reason(R): It possesses kinetic energy.
a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Short Answer Type Questions:

Q7. Name the process which occurs when a drop of dettol is added to water.

Q8. Name the state of matter in which -
i. layers of particles can slip and slide over one another easily.
ii. particles just move around randomly because of very weak force of attraction.

Q9. Why do the gases exert more pressure on the walls of the container than the solids?

Q10. Why do we see water droplets on the outer surface of a glass containing ice cold water?

Q11. Why are gases compressible but not liquids?

Long Answer Type Questions:

Q12. Differentiate between boiling and evaporation.

Q13. Explain evaporation and its cooling effect in terms of kinetic energy of particles.

Q14. Why does the temperature of a substance remain constant during its melting point or boiling point?

Q15. With proper explanation, explain whether the following statements are true or false.
i. Sublimation occurs only when the solid is heated.
ii. A lighter gas can move downwards and a heavier gas can move upwards.
iii. Interconversion of matter is a constant temperature process.

Q16. Classify the following into osmosis/diffusion.
i. Swelling up of a raisin on keeping in water.
ii. Spreading of virus on sneezing.
iii. Shrinking of grapes kept in thick sugar syrup.
iv. Preserving pickles in salt.

Chapter -2: Nature of Matter

Case-based Type Questions:

Q1. The purest form of matter is called an element. A pure substance consists of a single type of particles. All the elements and compounds are pure substances because they contain only one kind of particles eg. hydrogen, oxygen etc. A homogeneous mixture of two or more substances called a true solution. It consists of solute and solvent.
The particle size of true solution is less than 1 nm. Suspension is a heterogeneous mixture in which the solute particle does not dissolve but remains suspended throughout the bulk of the medium. Colloid is a mixture that is actually heterogeneous but appears to be homogeneous as the particle are uniformly spread throughout the solution.
Read the passage carefully and answer the following questions:
i. Which of the statement is true about pure substances?
a. Homogeneous mixtures are pure as they have same composition throughout.
b. 22 carat gold is pure in nature.
c. Elements are not pure in nature.
d. Gold is pure in nature.

ii. Which of the following is most stable?
   a. True solution
   b. Suspension
   c. Colloid
   d. Both a and b

iii. Which statement is incorrect about Tyndall effect?
   a. True solution show Tyndall effect
   b. Suspension show Tyndall effect
   c. Colloid show Tyndall effect
   d. Both b and c

iv. Which is the correct order of stability of solution?
   a. True solution<colloid<suspension
   b. Colloid<suspension<true solution
   c. Colloid<true solution< suspension
   d. Suspension<colloid<true solution

v. Sugar is pure substance because-
   a. it cannot be separated
   b. it can be separated
   c. it contains carbon and hydrogen
   d. it is crystalline

Objective Type Questions:

Q2. Which of the following properties does not describe a compound?
   a. It is composed of two or more elements
   b. It is a pure substance
   c. It cannot be separated into constituents by physical means
   d. It is mixed in any proportion by mass

Q3. In the tincture of iodine, find the solute and solvent?
   a. Alcohol is the solute and iodine is the solvent
   b. Iodine is the solute and alcohol is the solvent
   c. Any component can be considered as solute or solvent
   d. Tincture of iodine is not a solution

Q4. An example of liquid metal and liquid non metal is
   a. gallium, mercury
   b. mercury, chlorine
   c. mercury, bromine
   d. bromine, sulphur

Q5. Assertion(A):The Tyndall effect can be observed when sunlight passes through the canopy of dense forest.
   Reason(R): Scattering of light by the particles of dust and smoke in the air cause Tyndall effect.
   a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   c. If Assertion is true but Reason is false.
   d. If Assertion is false but Reason is true.

Q6. Assertion(A): The particles of a suspension can be seen by the naked eye.
   Reason(R): Suspension is a heterogeneous mixture.
   a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   c. If Assertion is true but Reason is false.
   d. If Assertion is false but Reason is true.

Short Answer Type Questions:

Q7. How can you change a saturated solution to an unsaturated solution without adding any more solvent to it?

Q8. Why is water called universal solvent?

Q9. An unknown substance 'A' on thermal decomposition produces 'B' and 'C'. What is 'A'—an element, a compound or a mixture?

Q10. Why is it not possible to distinguish particles of a solute from the solvent in solution?

Q11. Explain why particles of a colloidal solution do not settle down when left undisturbed, while in the case of a suspension they do.

Long Answer Type Questions:

Q12. Differentiate between -

i. Physical change and chemical change

ii. Saturated and unsaturated solution

Q13. Define emulsion and gel. Give two examples of each.

Q14. During an experiment the students were asked to prepare a 10% (Mass/Mass) solution of sugar in water. Ramesh dissolved 10 g of sugar in 100 g of water while Sarika prepared it by dissolving 10 g of sugar in water to make 100 g of the solution.

i. Are the two solutions of the same concentration?

ii. Compare the mass % of the two solutions.

Q15. Explain why, air is considered a mixture and not a compound.

Q16. Write any 3 properties of metals.

Chapter-3: Particle Nature and their Basic Units

Case-based Type Questions:

Q1. The molecular mass of a substance is the sum of the atomic masses of all the atoms in a molecule of the substance. It is therefore, the relative mass of a molecule expressed in atomic mass unit (u). Depending upon the number of atoms of same or different elements present in the molecule, it can be monoatomic, diatomic, triatomic, tetra-atomic or polyatomic molecule.
The formula unit mass is calculated in the same manner as the molecular mass calculated. It is a sum of the atomic masses of all atoms in a formula unit of compound.
Read the passage carefully and answer the following questions:

i. Which of the following is an example of polyatomic molecule?
   a. H_2 b. O_2
   c. S_8 d. Cl_2

ii. The relative molecular mass of H_2O is
   a. 23 u b. 18 u
   c. 10 u d. 40 u

iii. How many atoms of oxygen are present in a molecule of $CuCO_3$?
   a. 3 b. 4
   c. 5 d. 6

iv. What is the ratio by mass of the combining elements in the compound ammonia?
   a. 14:3 b. 14:2
   c. 3:14 d. 2:14

v. What is the formula unit mass of $CaCl_2$?
   a. 110 u b. 94 u
   c. 111 u d. 115 u

Objective Type Questions:

Q2. Which of the following represents 12 u?
   a. Mass of 1 hydrogen atom b. Mass of C-12 atom
   c. Mass of O-16 atom d. 1/12th of mass of C-12 atom.

Q3. The chemical symbol for nitrogen gas is
   a. Ni b. N_2
   c. N^+ d. N

Q4. A box contains some identical red coloured balls labelled as A each weighing 2 g. Another box contains identical blue coloured balls, labelled as B, each weighing 5 g. In the combinations AB, AB_2, A_2B and A_2B_3 which is applicable?

a. Law of definite proportion
b. Law of multiple proportion
c. Law of conservation of mass
d. None of the above

Q5. Assertion(A): N_2 and H_2O are molecules.
Reason(R): A molecule can have only similar kind of atoms.
a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Q6. Assertion(A): The valency of aluminium is 3 and oxygen is 2.
Reason(R): The chemical formula of aluminium oxide is Al_2O_3.
a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Short Answer Type Questions:

Q7. Write any four postulates of Dalton's atomic theory.

Q8. Write the chemical formulae for the following.
i. Calcium oxide
ii. Sodium nitrate

Q9. Define atomicity. Write the atomicity of the sulphur and phosphorus molecules.

Q10. The atomic number of three elements A, B and C are 9, 10 and 13 respectively. Which of them will form a cation?

Q11. Calculate the formula mass of sodium carbonate ($Na_2CO_3.10H_2O$).

Long Answer Type Questions:

Q12. Explain law of conservation of mass.

Q13. Calculate the molecular mass of the following.
i. H_2CO_3
ii. C_2H_5OH
iii. $MgSO_4$

Q14. Differentiate between cation and anion.

Q15. Write the formulae for the following and calculate the molecular mass for each one of them.
i. Quick lime
ii. Baking powder
iii. Calcium carbonate
iv. Potassium sulphate
v. Hydrogen bromide
vi. Common salt

Q16. Explain law of constant proportion with the help of an example.

Chapter-4: Matter –Structure of Atoms

Case-based Type Questions:

Q1. Protons are present in the nucleus of an atom. The mass of an atom is practically due to protons and neutrons alone. The knowledge of valencies of various radicals helps us to write the formulae of chemical compounds. The total positive charge on positive ions is equal to the total negative charge on negative ions in a molecule. Therefore, in writing the formula of a compound, the positive and negative ions are adjusted in such a way that the total number of positive charges of positive ions becomes equal to the total number of negative charges of negative ions.
There is another simple method for writing the formulae of ionic compounds. In this method, the valencies (positive or negative charges) of the ions can be 'crossed over' to give subscripts.
Read the passage carefully and answer the following questions:

i. Element X has two valencies 5 and 3 and Y has valency 2. The elements X and Y are most likely to be respectively
a. copper and sulphur
b. sulphur and iron
c. phosphorus and fluorine
d. nitrogen and iron

ii. The formula of the sulphate of an element X is $X_2(SO_4)_3$. The formula of nitride of element X will be

a. X_2N b. XN_2

c. XN d. X_2N_3

iii. The formula of a compound is X_3Y. The valencies of elements X and Y will be respectively

a. 1 and 3 b. 3 and 1

c. 2 and 3 d. 3 and 2

iv. The positive charge on sodium is-

a. 3 b. 2

c. 4 d. 1

v. The sum of the total number of protons and neutrons present in the nucleus of an atom is-

a. atomic number b. mass number

c. atomic weight d. none of the above

Objective Type Questions:

Q2. Which of the following correctly represents the electronic distribution in the Mg atom?

a. 3, 8, 1 b. 2, 8, 2

c. 1, 8, 3 d. 8, 2, 2

Q3. Rutherford's 'alpha (α) particles scattering experiment' resulted in the discovery of-

a. electron b. proton

c. nucleus in the atom d. atomic mass

Q4. Which of the following statement is always correct?

a. An atom has equal number of electrons and protons.

b. An atom has equal number of electrons and neutrons.

c. An atom has equal number of protons and neutrons.

d. An atom has equal number of electrons, protons and neutrons.

Q5. Assertion(A): Atomic mass of aluminum is 27.

Reason(R): An atom of aluminum is 27 times heavier than 1/12th of the mass of the carbon-12 atom.

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

c. If Assertion is true but Reason is false.

d. If Assertion is false but Reason is true.

Q6. Assertion(A): Isobars possess the same number of protons.

Reason(R): Isotopes of chlorine occur in the ratio 1:4.

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

c. If Assertion is true but Reason is false.

d. If Assertion is false but Reason is true.

Short Answer Type Questions:

Q7. Why noble gases show least reactivity?

Q8. Write the electronic configuration of the elements whose atomic numbers are 7, 17 and 19.

Q9. What are isotopes? Write two applications of isotopes.

Q10. What is the similarity in the electronic structure of lithium, sodium and potassium?

Q11. Show diagrammatically the electron distribution in a sodium atom and a sodium ion and also give their atomic number.

Long Answer Type Questions:

Q12. Calculate the atomic number of the element whose atomic nucleus has mass number of 23 and neutron number 12. What is the symbol for this element?

Q13. One electron is present in the outermost shell of the atom of an element 'Z'.

i. What will be the nature of this element?
ii. What will be the value of charge of the ion formed, if this electron is removed from the outermost shell?

Q14. Write postulates of Bohr's model of an atom.

Q15. The number of protons, neutrons and electrons in particles from A to E are given below.

Particle	Protons	Neutrons	Electrons
A	17	18	17
B	3	4	2
C	18	22	18
D	17	20	17
E	9	10	10

i. Which one is a cation?
ii. Which one is an anion?
iii. Which represent pair of isotopes?

Q16. Give reasons.

i. Atom is electrically neutral.
ii. Atom as a whole is an empty space.
iii. Rutherford model of atom could not provide stability to the nucleus.

Chapter-5: Cell-Basic Unit of Life

Case-based Type Questions:

Q1. Every cell has a membrane around it keep its own contents separate from the external environment. Large and complex cells need a lot of chemical activities to support their structure and function. To keep these activities of different kinds separate from each other, these cells use membrane bound structures within themselves. This is one of the features of the eukaryotic cells that distinguish them from prokaryotic cells.
Read the passage carefully and answer the following questions:

i. Ribosomes are the centre for-
a. respiration
b. photosynthesis
c. protein synthesis
d. all of these

ii. Double membrane is absent in-
a. mitochondria
b. chloroplast
c. nucleus
d. lysosomes

iii. Which of the following is responsible for the mechanical support, protein synthesis and transport of material?
a. Cell membrane
b. Ribosomes
c. Endoplasmic reticulum
d. Golgi apparatus

iv. Which of the following is not a membrane bound organelle?
a. Ribosomes
b. Lysosomes
c. ER
d. Nucleus

v. Which is the largest cell organelle present in the plant cell?
a. Nucleus
b. Chloroplast
c. Endoplasmic reticulum
d. Mitochondria

Objective Type Questions:

Q2. Which plastids are colourless?

a. Chromoplast
b. Leucoplast
c. Chloroplast
d. None of these

Q3. Where are the essential proteins and lipids required for cell membrane, manufactured?

a. Endoplasmic Reticulum
b. Plastids
c. Mitochondria
d. Vacuoles

Q4. Chromosomes are made up of-

a. DNA
b. Protein
c. DNA and protein
d. RNA

Q5. Assertion(A): Lysosomes are called as suicidal bags of the cell.
Reason(R): Lysosomes provide turgidity and rigidity to the cell.

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Q6. Assertion(A): Chloroplast is called the kitchen of the cell.
Reason(R): Chlorophyll pigment is present in chloroplast which helps in photosynthesis.

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Short Answer Type Questions:

Q7. Why does the skin of your finger shrink when you wash clothes for a long time?

Q8. If you are provided with some vegetables to cook, you generally add salt to the vegetables during the cooking process. After adding salt, vegetables release water. What mechanism is responsible for this?

Q9. Why do plant cells possess large-sized vacuole?

Q10. Endocytosis is found in animals only. Justify.

Q11. Do you agree "A cell is a building unit of an organism". If yes, explain why?

Long Answer Type Questions:

Q12. Grass looks green, papaya appears yellow. Which cell organelle is responsible for this? Explain about it.

Q13. In brief state what happens when

i. dry apricots are left for sometime in pure water and later transferred to sugar solution?
ii. a red blood cell is kept in concentrated saline solution?
iii. the plasma membrane of a cell breaks down.

Q14. Draw a plant cell and label the parts which

i. determines the function and development of the cell.
ii. packages materials coming from the endoplasmic reticulum.
iii. provides resistance to microbes to withstand hypotonic external media without bursting.

Q15. A person takes concentrated solution of salt, after sometime, he starts vomiting. What is the phenomenon responsible for such situation? Explain.

Q16. Differentiate between rough and smooth endoplasmic reticulum. How is endoplasmic reticulum important for membrane biogenesis?

Chapter-6: Tissues, Organs, Organ System, Organism

Case-based Type Questions:

Q1. On the basis of dividing capacity, plant tissues can be classified into two fundamental types namely meristematic tissues and permanent tissues. In meristematic tissues, cells are capable of division. In permanent tissues, mature cells are not capable of cell division.
Read the passage carefully and answer the following questions:

i. Which of the following tissues has dead cells?
   a. Parenchyma b. Sclerenchyma
   c. Collenchyma d. Epithelial tissue

ii. The girth of stem increases due to-
   a. apical meristem b. lateral meristem
   c. intercalary meristem d. vertical meristem

iii. If the tip of sugarcane plant is removed from the field, even then it keeps on growing in length. It is due to the presence of-
   a. cambium b. apical meristem
   c. lateral meristem d. intercalary meristem

iv. Flexibility in plants is due to-
   a. collenchyma b. sclerenchyma
   c. parenchyma d. chlorenchyma

v. Cells of intercalary meristem lacks-
   a. vacuoles b. nuclei
   c. cytoplasm d. cell wall

Objective Type Questions:

Q2. Which of the following is connective tissue?
   a. Ligament b. Tendon
   c. Blood d. All of these

Q3. Rapid elongation of a bamboo stem is due to
   a. lateral meristem b. intercalary meristem
   c. apical meristem d. cambium

Q4. Meristematic tissues in plants are
   a. localised and permanent b. not limited to certain regions
   c. localised and dividing cells d. growing in volume

Q5. Assertion(A): Blood is a fluid connective tissue.
Reason(R): It is a motile connective tissue which connects all the tissues, organs with each other.
   a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   c. If Assertion is true but Reason is false.
   d. If Assertion is false but Reason is true.

Q6. Assertion(A): Axon and dendrites are special features of neurons. Reason(R): They help in the rapid conduction of nerve impulses.
   a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   c. If Assertion is true but Reason is false.
   d. If Assertion is false but Reason is true.

Short Answer Type Questions:

Q7. Differentiate the following activities on the basis of voluntary (V) or involuntary (IV) muscles.
   i. Jumping of frog ii. Pumping of the heart iii. Writing with hand

Q8. Water hyacinth float on water surface. Explain.

Q9. Epidermis is important for the plants. Justify

Q10. A person met with an accident in which two long bones of hand were dislocated. What could be the possible reason?

Q11. Why is the epidermis present as a thick waxy coating of cutin in desert plants?

Long Answer Type Questions:

Q12. Why are plants and animals made of different types of tissue?

Q13. Draw and label different elements of phloem.

Q14. Give reasons.

i. Meristematic cells have a prominent nucleus and dense cytoplasm but they lack vacuole.
ii. Intercellular spaces are absent in sclerenchymatous tissues.
iii. We get a crunchy and granular feeling when we chew pear fruit.

Q15. Name the tissue and write characteristic feature of following.

i. Connects bone to bone in humans.
ii. Forms inner lining of alveoli.
iii. Transports water and minerals in plants

Q16. Explain the significance of the following.

i. Hair like structures on epidermal cells.
ii. Small pores in epidermis of leaf.
iii. Numerous layers of epidermis in cactus.

Chapter – 8: Motion

Case-based Type Questions:

Q1. When an object moves in a circular path with uniform speed, its motion is called uniform circular motion. The direction of motion changed at every point moving along the circular path. Read the passage carefully and answer the following questions:

i. Which one of the following is most likely not a case of uniform circular motion?
   a. The motion of the earth around the sun.
   b. The motion of a toy train on a circular track.
   c. The motion of a racing car on a circular track.
   d. The motion of hours' hand on the dial of a clock.

ii. The train is moving on a track. Though the speed of a train is constant the direction of motion (or direction of speed) is changing continuously. So, the train is exhibiting-
   a. Uniform motion
   b. Decelerated motion
   c. Non-Uniform motion
   d. Accelerated motion

iii. A cyclist goes around a circular track once every 2 minutes. If the radius of the circular track is 105 metres, calculate his speed.
   a. 5.5m/s b. 5.6m/s
   c. 5.7m/s d. 5.8m/s

iv. A particle is moving in a circular path of radius r. The displacement after half a circle would be
   a. zero b. πr
   c. $2r$ d. $2\pi r$

v. A sprinter is running along the circumference of a big sports stadium with constant speed. Which of the following do you think is changing in this case?
   a. The magnitude of acceleration produced

b. Distance covered by the sprinter per second
c. The direction in which the sprinter is running
d. The centripetal force acting on the sprinter

Objective Type Questions:

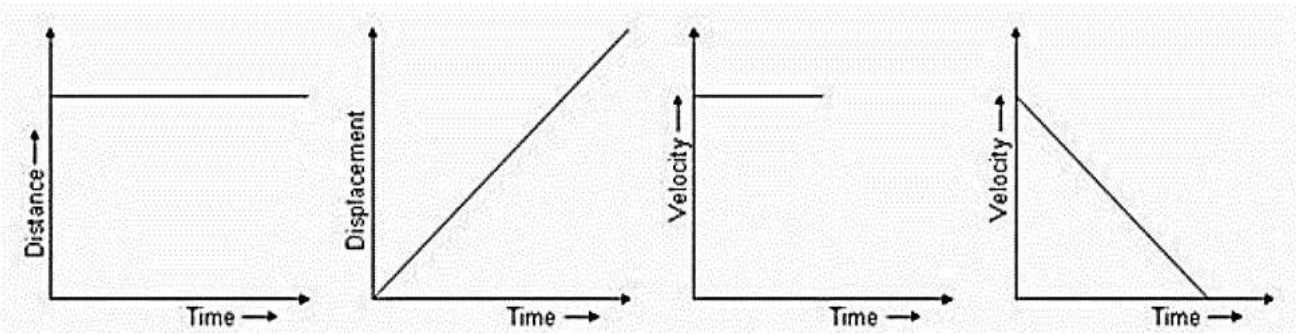
Q2. Which of the following statements is correct?

a. Both speed and velocity are same
b. Speed is scalar and velocity is vector quantity
c. Speed is vector and velocity is scalar quantity
d. None of these

Q3. What is the slope of the body when it moves with uniform velocity?

a. Positive
b. Negative
c. Zero
d. May be positive or negative

Q4. Which of the following graphs shows that the body is at rest?



a. b. c. d.

Q5. Assertion(A): An object may acquire acceleration even if it is moving at a constant speed.
Reason(R): With change in the direction of motion, an object can acquire acceleration.

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Q6. Assertion(A): Velocity versus time graph of a particle in uniform motion along a straight path is a line parallel to the time axis.
Reason(R): In uniform motion, the velocity of a particle increases as the square of the time elapsed.

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Short Answers Type Questions

Q7. Under what condition(s) is the magnitude of average velocity of an object equal to its average speed?

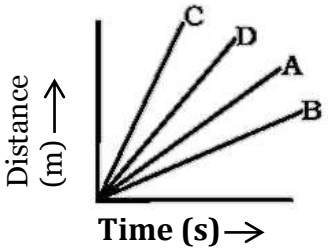
Q8. During an experiment, a signal from a spaceship reached the ground station in five minutes. What was the distance of the spaceship from the ground station? The signal travels at the speed of light, that is, $3 \times 10^8 ms^{-1}$.

Q9. When will you say a body is in

i. uniform acceleration.
ii. non-uniform acceleration.

Q10. A trolley, while going down an inclined plane, has an acceleration of 2 cm s^{-2}. What will be its velocity 3 s after the start?

Q11. Four cars A, B, C and D are moving on a levelled road. Their distance versus time graph is shown in the adjacent figure. Choose the correct statement.



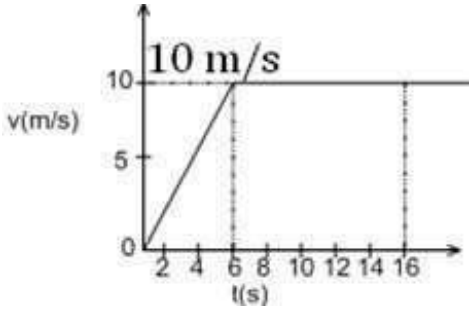
i. Which car is fastest

ii. Which car is slowest.

Long Answer Type Questions

Q12. The velocity time graph of runner is given in the graph.

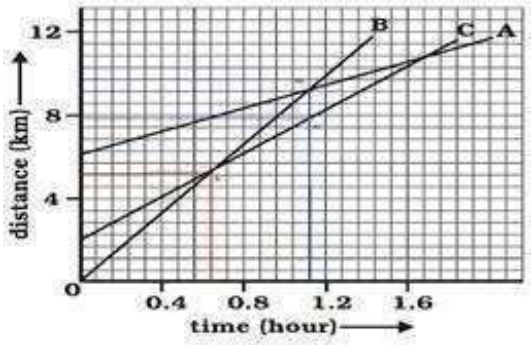
i. What is the total distance covered by the runner in 16 s?



ii. What is the acceleration of the runner at t =11 s?

Q13. An athlete completes one round of a circular track of diameter 200 m in 40 s. What will be the distance covered and the displacement at the end of 2 minutes 20 s?

Q14. Following distance-time graph of three objects A, B and C. Study the graph and answer the following questions.



i. Which of the three is travelling the fastest?

ii. Are all three ever at the same point on the road?

iii. How far has C travelled when B passes A?

iv. How far has B travelled by the time it passes C?

Q15. The position of a body at different times are recorded in the table given below-

Time (s)	0	1	2	3	4	5	6	7	8
Displacement (m)	0	6	12	18	24	30	36	42	48

i. Draw the displacement time graph for the above data.

ii. What is the slope of graph?

iii. What is the speed of the body?

Q16. Answer the following:

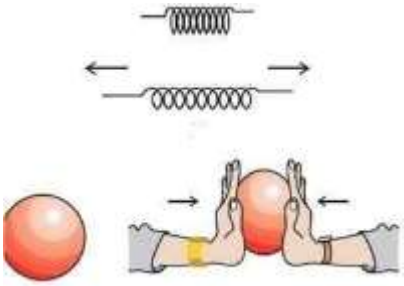
i. Derive the second equation of motion graphically.

ii. A stone is thrown in a vertically upward direction with a velocity of $5ms^{-1}$**.** If the acceleration of the stone during its motion is 10 m s^{-2} in the downward direction, what will be the height attained by the stone and how much time will it take to reach there?

Chapter – 9: Force and Newton's Law

Case-based Type Questions:

Q1. The third law of motion states that when one object exerts a force on another object, the second object instantaneously exerts a force back on the first. These two forces are always equal in magnitude but opposite in direction.



Read the passage carefully and answer the following questions:

i. Recoiling of the gun is an example of-

a. Newton's first law of motion
b. Newton's second law of motion
c. Newton's third law of motion
d. Newton's law of gravitation

ii. Which of the following is an incorrect statement?

1.The two opposite forces are known as the cation force.
2.The two forces are equal in magnitude.
3.There is a pair of forces.
4.The two forces are not equal in magnitude.

a.1 and 2
b. 2 and 3
c. 3 and 4
d. 1 and 3

iii. A boy of mass 50 kg standing on the ground exerts a force of 500 N on the ground. The force exerted by the ground on the boy will be_____.

a. 50 N
b. 25000 N
c. 10 N
d. 500 N

iv. The acceleration produced by a force of 5 N acting on a mass of 20 kg in m/s^2 is –

a. 4
b. 100
c. 0.25
d. 2.5

Objective Type Questions:

Q2. In the following diagram the direction of the boat will be-

a. move away from the shore
b. move towards the shore
c. remains stationary
d. none of these

Q3. If the force acting on the body is zero. Its momentum is
a. zero
b. constant
c. both a and b
d. none of these

Q4. The people in the bus are pushed backwards when the bus starts suddenly due to -
a. inertia due to rest
b. inertia due to motion
c. inertia due to direction
d. inertia

Q5. Assertion(A): When a firefly hits a bus, each of them exerts the same force.
Reason(R): Firefly has more mass as compared to the wind shield.
a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Q6. Assertion(A): While walking on ice, one should take small steps to avoid slipping.
Reason(R): This is because smaller steps ensure smaller friction.
a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Short Answer Type Questions

Q7. A body of mass 5 kg starts and rolls down 32 m of an inclined plane in 4 s. Find the force acting on the body?

Q8. Explain why some of the leaves may get detached from a tree if we vigorously shake its branch.

Q9. A boy throws a stone up with a velocity of 60 m/s. ($g = -10\ m/s^2$)
i. How long will it take to reach the maximum height?
ii. What will be the maximum height reached by the stone?
iii. What will be its velocity when it reaches the ground?

Q10. From a rifle of mass 4 kg, a bullet of mass 50 g is fired with an initial velocity of 35 m s^{-1}.Calculate the initial recoil velocity of the rifle.

Q11. Why does a person while firing a bullet holds the gun tightly to his shoulders?

Long Answer Type Questions

Q12. Derive the law of conservation of momentum from Newton's third law.

Q13. A body of mass 2 kg is at rest at the origin of a frame of reference. A force of 5 N acts on it at t= 0. The force acts for 4 s and then stops.
i. What is the acceleration produced by the force on the body?
ii. What is the velocity at t=4 s?
iii. Draw the v – t graph for the period t = 0 to t = 6 s.
iv. Find the distance travelled in 6 s.

Q14. Two objects of masses 100 g and 200 g are moving along the same line and direction with velocities of 2 m s^{-2} and 1 m s^{-1} respectively. They collide and after the collision, the first object moves at a velocity of 1.67 m s^{-1}. Determine the velocity of the second object.

Q15. A ball is thrown up vertically returns to the thrower after 6 s. Find
i. The velocity with which it was thrown up.
ii. The maximum height it reaches, and
iii. Its position after 4 s.

Q16. Using second law of motion, derive the relation between force and acceleration. A bullet of mass 10 g strikes a sand bag with a velocity of 103 ms^{-1} and gets embedded after travelling 5 cm.
Calculate
i. the resistive force exerted by the sand bag on the bullet.
ii. the time taken by the bullet to come to rest.

Chapter – 10: Gravitation

Case-based Type Questions:

Q1. Archimedes' Principle: Whenever an object is immersed partly or completely in a fluid, the fluid exerts an upwards force on it. The upwards force acting on the immersed object is called buoyant force or upthrust. A Greek scientist Archimedes' experimentally measured the magnitude of buoyant force and on the basis of his experimental results he obtained a principle which is known as Archimedes' principle. As per this principle whenever an object is immersed in a fluid, it experiences a buoyant force whose magnitude is equal to weight of the fluid displaced by the immersed part of object.
Read the passage carefully and answer the following questions:

i. Which of the following can exert a buoyant force?
a. A liquid only
b. Any solid
c. A gas only
d. A liquid as well as a gas

ii. SI unit of upthrust force is_____
a. N
b. Pa
c. Nm^{-2}
d. Nm

iii. Two spheres, one of aluminium and the other of iron, of same radius are fully immersed in alcohol. Then_____
a. upthrust on aluminium sphere is more than that on iron sphere.
b. upthrust on aluminium sphere is less than that on iron sphere.
c. upthrust on both spheres is exactly the same.
d. upthrust on aluminium sphere may be either less or more than that on iron sphere.

iv. When a solid object is gently put on a liquid, a buoyant force acts on it due to that liquid. The buoyant force is_____
a. in vertically downward direction.
b. in vertically upward direction.
c. tangential to the force liquid surface.
d. uniformly acting in all direction.

v. Ships and submarines are designed on the basis of_____
a. Pascal's law
b. Torriceli's law
c. Archimedes' principle
d. Kepler's law

Objective Type Questions:

Q2. If the distance between two objects is doubled, the gravitational force between them
a. remains the same
b. gets doubled
c. becomes one fourth
d. gets halved

Q3. A stone is dropped from a cliff. Its speed after it has fallen 100 m is
a. 98 ms^{-1}
b. 19.69 ms^{-1}
c. 9.8 ms^{-1}
d. 44.2 ms^{-1}

Q4. Which of the following is an application of Earth's gravitation?

A. It holds atmosphere around our globe

B. It holds us firmly on the surface of the Earth

C. It is responsible for motion of moon

D. It is responsible for sea tides due to the moon

a. A and B

b. A, B and D

c. All of these

d. A and C

Q5. Assertion(A): When distance between two bodies is doubled and also mass of each body is doubled, then the gravitational force between them remains the same.

Reason(R): According to Newton's law of gravitation, the force between two objects is directly proportional to the product of their masses.

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

c. If Assertion is true but Reason is false.

d. If Assertion is false but Reason is true.

Q6. Assertion(A): The value of acceleration due to gravity changes with the height, depth and shape of the earth.

Reason(R): Acceleration due to gravity is zero at the centre of the earth.

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

c. If Assertion is true but Reason is false.

d. If Assertion is false but Reason is true.

Short Answer Questions

Q7. What do you mean by buoyancy?

Q8. What is the acceleration of freefall?

Q9. The earth and the moon are attracted to each other by gravitational force. Does the earth attract the moon with a force that is greater or smaller or the same as the force with which the moon attracts the earth? Why?

Q10. Why does a block of plastic released under water come up to the surface of water?

Q11. What are fluids? What are the factors on which the upward pressure at a point on a fluid depends?

Long Answer Type Questions

Q12. If the mass of one object is doubled and mass of other remains the same and if distance between them is halved then how does the gravitational force change?

Q13. The radius of the earth is about 6370 km. An object of mass 30 kg is taken to a height of 230 km above the surface of earth.

i. What is the mass of the body?

ii. What is the acceleration due to gravity at this height?

iii. What is the weight of the body at this height?

Q14. The volume of 50 g of a substance is 20 cm^3. If the density of water is 1g cm^{-3}, will the substance float or sink?

Q15. A stone is released from the top of a tower of height 19.6 m. Calculate its final velocity.

Q16. A man of mass 60 kg is standing on the floor holding a stone weighing 40 N. What is the force with which the floor is pushing him up?

Chapter-11: Work, Energy and Power

Case-based Type Questions:

Q1. Mechanical Work: The term work is commonly used in our day-to-day life. However, there is a difference in the way we use the term work in day-to-day life and the way we use it in science. Let Smita be preparing for her board examination. She spends a lot of time in studies. She reads books, prepares notes, solves the problems, attends her classes and performs experiments etc. In common parlance she is working hard but by the scientific definition of work she is doing either no or a very little work.

In science work is said to be done when a force acting on an object actually displaces the object in the direction of force applied. Work done (W) by a force (F) acting on an object is equal to the magnitude of the force multiplied by the distance (s) moved in the direction of force.

Mathematically, Work done (W)= Force (F) x distance moved in the direction of force(s). Work has only magnitude but no direction.

Read the passage carefully and answer the following questions:

i. SI unit of mechanical work is joule (J) where 1 joule is equal to

a. 1 Nm b. 1 Nm^{-1}

c. 1 Nm^{2} d. 1 Nm^{-2}

ii. The work done on an object does not depend upon the

a. displacement b. force applied

c. angle between force and displacement d. initial velocity of the object

iii. A girl is carrying a school bag of 6 kg mass on her back and moves 200 m on a level road. Work done by the girl against the load of bag is

a. 12000 J b. 1200 J

c. zero d. -1200 J

iv. If direction of force is opposite to the direction of displacement, the work done by the force is

a. positive work b. negative work

c. zero work d. none of these

v. You lift a heavy book from the floor of the room and put it in a book shelf at a height of 2m above the floor. If you take 2 minutes in this process then the work done by you will depend upon

a. mass of the book and time taken.

b. weight of the book and height of book shelf.

c. height of book shelf and time taken.

d. mass of book, height of shelf and time taken.

Objective Type Questions:

Q2. An electric lamp of 100 W is used for 5 hours per day. Calculate the units of energy consumed by lamp in one day.

a. 1.5 units b. 2 units

c. 0.5 unit d. 1unit

Q3. P. E of your body is maximum when you

a. are standing b. are sitting on the chair

c. are sitting on the ground d. lie down on the ground

Q4. Which of the following quantities have same units?

a. Power and energy b. Power and work

c. Work and energy d. None of the above

Q5. Assertion(A): A winded toy car, when placed on floor, starts moving.
Reason(R): Toy car has kinetic energy stored in it which facilitates its motion.
a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Q6. Assertion(A): A spring has potential energy, both when it is compressed or stretched.
Reason(R): In compressing or stretching, work is done on the spring against the restoring force.
a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Short Answer Type Questions

Q7. A mass of 10 kg is at a point A on a table. It is moved to a point B. If the line joining A and B is horizontal, what is the work done on the object by the gravitational force? Explain your answer.

Q8. If a 100 J of work was done, when a force of 12.5 N acts, what was the distance moved by the force?

Q9. A man of mass 50 kg runs up a flight of stairs having a rise of 5 m is 4 s.
i. What is the work done by the man?
ii. What is the average power developed by the man?

Q10. A certain household has consumed 250 units of energy during month. How much energy is this in Joules?

Q11. The potential energy of a freely falling object decreases progressively. Does this violate the law of conservation of energy ? Why?

Long Answer Type Questions:

Q12. Derive an expression for the kinetic energy of the body? Calculate the kinetic energy for a body of mass 5 kg moving with a velocity 2.5 m/s^2.

Q13. What is power? Show that Power=Force x Velocity. Calculate power of a body of mass 10 kg accelerating with 10 m/s^2 acquires a velocity of 5 m/s .

Q14. A body of mass 5 kg is lifted vertically at a constant velocity of 12m. Calculate
i. the force applied.
ii. work done in lifting the body.

Q15. Work is done whenever a force moves something over a distance. You can calculate the energy transferred, or work done, by multiplying the force by the distance moved in the direction of the force. Energy transferred = work done = force x distance moved in the direction of the force.
Four men lift a 250 kg box to a height of 1 m and hold it without raising or lowering it.
i. How much work is done by the men in lifting the box?
ii. How much work do they do in just holding it?
iii. Why do they get tired while holding it? ($g = 10\ ms^{-2}$)

Q16. The velocity of a body moving in a straight line is increased by applying a constant force F, for some distance in the direction of the motion. Prove that the increase in the kinetic energy of the body is equal to the work done by the force on the body.

Chapter-12: Sound

Case-based Type Questions:

Q1. Loudness and Intensity of sound: It is our common experience that if one beats the membrane of a drum, using a drum stick, gently then a soft sound is produced. However, if the person starts beating at a harder pace, then a loud sound is produced. The loudness of a sound is its characteristic due to which we are able to distinguish between a loud sound and a soft sound. The loudness of a sound mainly depends on the amplitude of vibrations. It also depends on the distance of the listener from the source of sound.

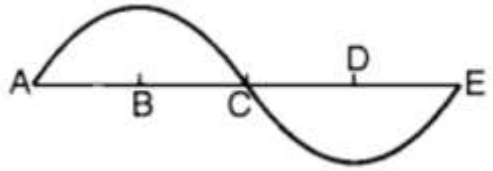
We sometimes use the terms loudness and intensity interchangeably but they are not the same. Loudness is a measure of the response of the ear to the sound. Thus, loudness is a subjective quantity.

Read the passage carefully and answer the following questions:

i. The loudness of a sound depends upon its _____

a. frequency
b. pitch
c. amplitude
d. wavelength

ii. What is the wavelength in the given curve?



a. AB
b. BD
c. DE
d. AE

iii. SI unit of intensity of sound wave

a. Js^{-1}
b. $Js\ m^{-2}$
c. $Js^{-1}m^{-2}$
d. $Js^{-1}m^{-1}$

iv. Usually loudness is expressed in-

a. Bel
b. Joule
c. Decibel
d. None of these

v. Select the correct statement out of the following.

a. Loudness is a subjective quantity but intensity is an objective quantity.
b. Loudness of a sound is inversely proportional to square of its amplitude.
c. Loudness of a sound is inversely proportional to the frequency of vibrations.
d. Loudness has the same unit as intensity of sound.

Objective Type Questions:

Q2. The frequency of a visible light of wavelength 600 nm is (speed of light = 3×10^8 m/s), ($1nm = 10^{-9}$ m)

a. 50 Hz
b. 5 × 1014 Hz
c. 0.5 × 1016 Hz
d. 500 Hz

Q3. Stethoscope work on the principle of -

a. multiple reflection of sound
b. ultrasound
c. both a and b
d. none of the above

Q4. Frequency of ultrasonic sound wave is

a. greater than 20 Hz
b. greater than 20,000 Hz
c. greater than 2 Hz
d. greater than 2 MHz

Q5. Assertion(A): With decrease in time period, frequency increases.
Reason(R): Time period and frequency are inversely proportional.

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true.

Q6. Assertion(A): The particles do not travel all the way from the vibrating object to the ear.
Reason(R): A particle of the medium in contact with the vibrating object is first displaced from its equilibrium position.

a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
c. If Assertion is true but Reason is false.
d. If Assertion is false but Reason is true**.**

Short Answer Type Questions:

Q7. Why are the ceilings of concert halls curved?

Q8. Define.

i. Time Period ii. Amplitude of a wave

Q9. An under water device directs ultrasounds of frequency 75 kHz towards water surface. What is the wavelength of sound in the air above the water surface and what is its frequency? Speed of sound in air = 340 m/s.

Q10. Flash and thunder are produced simultaneously. But thunder is heard a few seconds after the flash is seen, why?

Q11. How can ultrasound be used to detect the defect in metal block?

Long Answer Type Questions:

Q12. Discuss briefly the structure and working of human ear.

Q13. A cork on the surface of water moves up down completing five vibrations in 4 s. The waves travel from a cork to the shore which is 20 m away in 10 s. Calculate

i. Speed
ii. Frequency
iii. Wavelength

Q14. An observer far away from a railway station hears the train starting. The sound arrive both from the steel rails and through air with a time difference of 3.5 s. How far is the railway station from the observer? The speed of sound in air and steel is 340 m/s and 5130 m/s respectively?

Q15. Write full form of acronym SONAR. Explain how the method of echo- ranging is used to determine the depth of sea.

Q16. A disused railway line has a length of 300 m. A man puts his ear against one end of the rail and another man hits the other end with a metal hammer.

i. Calculate the time it takes for the sound to travel along the rail. If sound travels at 5000 m/s in steel.
ii. The man with his ear to the railway line actually hears two sounds from the hammer separated by a short interval. Explain why he hears two sounds.

Chapter-15: Food Production

Case-based Type Questions:

Q1. Different crops require different climatic conditions, temperature and photoperiods for their growth and completion of their life cycle. Photoperiods are related to the duration of sunlight. Growth of plants and flowering are dependent on sunlight. Plants manufacture their food in sunlight by the process of photosynthesis.

Read the passage carefully and answer the following questions:

i. Select the odd one.
   a. Wheat
   b. Linseed
   c. Gram
   d. Maize

ii. Cereals provide us
   a. proteins
   b. fats
   c. carbohydrates
   d. all of these

iii. Soya bean grows best from-
   a. June to October
   b. November to April
   c. April to May
   d. None of these

iv. Example of intercropping-
   a. millet and cowpea
   b. wheat and paddy
   c. gram and cotton
   d. all of these

v. Crops improvement is done for
   a. high yield
   b. change in maturity duration
   c. wider adaptability
   d. all of these

Objective Type Questions:

Q2. Which one is an oil yielding plant among the following?
   a. Lentil
   b. Sunflower
   c. Cauliflower
   d. Hibiscus

Q3. Poultry fowl are susceptible to the following pathogens-
   a. viruses
   b. bacteria
   c. fungi
   d. all of the above

Q4. Which one of the following nutrients is not available in fertilizers?
   a. Nitrogen
   b. Phosphorus
   c. Iron
   d. Potassium

Q5. Assertion(A): Inspite of large population of cattle, milk production is meagre in India.
Reason (R): Poor quality feed is given to cattle.
   a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   c. If Assertion is true but Reason is false.
   d. If Assertion is false but Reason is true.

Q6. Assertion(A): Pesticides are poisonous for living organisms and cause pollution.
Reason(R): Organic farming is environment friendly and does not rely on chemicals.
   a. If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
   b. If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
   c. If Assertion is true but Reason is false.
   d. If Assertion is false but Reason is true.

Short Answer Type Questions:

Q7. Can increasing grain production alone solve the problem of malnutrition and hunger?
Q8. What happens due to deficiency of nutrients?
Q9. Why is excess use of fertilizers detrimental for the environment?
Q10. Why should pesticides be used judiciously?
Q11. Enumerate the advantages of mixed farming.

Long Answer Type Questions:

Q12. Enlist the criteria for the selection of crops for mixed cropping.
Q13. Discuss various methods for weed control.

Q14. If there is low rainfall in a village throughout the year, what measures will you suggest to the farmers for better cropping?

Q15. What would happen if poultry birds are larger in size and have no summer adaptation capacity? In order to get small-sized poultry birds having summer adaptability, what method will be employed?

Q16. Figure shows the two crop fields [plot A and B] have been treated by manures and chemical fertilizers respectively, keeping other environmental factors same.

Observe the graph and answer the following questions.

i. Why does plot B show sudden increase and then gradual decrease in yield?

ii. Why is the highest peak in plot A graph slightly delayed?

iii. What is the reason for the different pattern of the two graphs?