

**GENERAL INSTRUCTIONS:**

- i. This question paper consists of 39 questions in 5 sections.
- ii. All questions are compulsory. However, an internal choice is provided in some questions.
- iii. Section A consists of 20 objective type questions carrying 1 mark each.
- iv. Section B consists of 6 very short answer type questions carrying 2 marks each. Answers to these questions should be in the range of 30 to 50 words.
- v. Section C consists of 7 short answer type questions carrying 3 marks each. Answers to these questions should be in the range of 50 to 80 words.
- vi. Section D consists of 3 long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
- vii. Section E consists of 3 source-based/case-based questions carrying 4 marks each with sub-parts.

**SECTION – A : MULTIPLE CHOICE QUESTIONS (1 Mark each)**

1. An object of mass 2 kg is sliding with a constant velocity of 4 m/s on a frictionless horizontal table. The force required to keep an object in uniform motion is: 1  
a) 2 N                      b) 4 N                      c) 8 N                      d) 0 N
2. Which of the following undergoes sublimation? 1  
a) Perfume                      b) Sugar                      c) Naphthalene balls                      d) Common salt
3. Which of the following statements is false? 1  
a) Mitochondria and plastid have their own DNA.  
b) Lysosomes are formed from Golgi apparatus.  
c) ATP is generated in mitochondria.  
d) Cytoplasm is also called protoplasm.
4. Select the correct statement. 1  
a) Only gases behave like fluids.  
b) Gases and solids both behave like fluids.  
c) Gases and liquids both behave like fluids.  
d) Only liquids are fluids.
5. The nuclear region of prokaryotes is also known as 1  
a) Nucleolus                      b) Centrosome                      c) Nucleoid                      d) Nucleic acid
6. Which of the following is a true solution? 1  
a) Vinegar                      b) Milk                      c) Blood                      d) Muddy water
7. Similar cells combine together to form: 1  
a) Organs                      b) Systems                      c) Tissue                      d) Body
8. Which out of these is the odd one? 1  
a) Sodium                      b) Germanium                      c) Aluminium                      d) Magnesium
9. 1  $\mu\text{m}$  is equivalent to 1  
a)  $10^{-6}$  m                      b)  $10^{-10}$  m                      c)  $10^{-9}$  m                      d)  $10^{-3}$  m
10. Identify the correct statement for pure substances? 1  
i) Pure substances contain only one kind of particles.  
ii) Pure substances may be compounds or mixtures.  
iii) Pure substances have the same composition throughout.  
iv) Pure substances can be only metals.  
a) (i) and (ii)                      b) (i) and (iii)  
c) (iii) and (iv)                      d) (ii) and (iv)
11. Organelle other than nucleus, containing DNA is 1  
a) Plastids                      b) Golgi apparatus  
c) Lysosome                      d) Endoplasmic reticulum
12. Forces of attraction are 1  
a) Maximum in solids and minimum in gases.  
b) Maximum in gases and minimum in solids.  
c) Maximum in liquids and minimum in gases.  
d) Maximum in gases and minimum in liquids.

13. Which of the following statements is incorrect? 1
- In its early stage, meristematic tissues lack vacuoles.
  - Intercalary and lateral meristems are permanent tissue.
  - Collenchymatous tissues are irregularly thickened at the corners.
  - Parenchymatous tissues have intercellular spaces.
14. Smoke is an example of 1
- Gas in gas colloid
  - Gas in solid colloid
  - Gas in liquid colloid
  - Solid in gas colloid
15. The dead component of phloem is: 1
- Sieve tubes
  - phloem parenchyma
  - phloem fibres
  - companion cells
16. Distance and displacement of hands of clock of length 7m for time 12:00 noon to 12:30 pm are: 1
- 7 m, 7 m
  - 14 m, 22 m
  - 22 m, 14 m
  - 22 m, 0 m

Question Nos. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- Both A and R are true, and R is the correct explanation of A.
  - Both A and R are true, and R is not the correct explanation of A.
  - A is true but R is false.
  - A is false but R is true.
17. **Assertion (A):** Tyndall Effect can be observed when light passes through a colloid. **Reason (R):** Particles of a colloid scatter the beam of light. 1
18. **Assertion (A):** Carbon dioxide and oxygen move across the cell membrane by a process called diffusion. **Reason (R):** This movement is due to cell's affinity towards gases. 1
19. **Assertion (A):** As plants grow older, the outer protective tissue undergoes certain changes to provide strength. **Reason (R):** The cells from meristem form – the bark. 1
20. **Assertion (A):** A boy riding bicycle on a crowded street exhibits non-uniform motion. **Reason (R):** The boy covers equal distance in equal intervals of time. 1

### SECTION – B : VERY SHORT ANSWER TYPE (2 marks each)

21. Explain whether the force is balanced or unbalanced in following situations: 2
- A suitcase is dropped from a certain height.
  - Bicycle is moving in a straight line with constant velocity.
  - In a game of tug of war two teams apply force but the rope does not move.
  - Ball rolling on ground stops after sometime.
22. a) Define velocity and acceleration.  
b) Is it possible for a body to have zero velocity but constant acceleration? Justify your answer. 2
- (OR)
- A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at a rate of  $10 \text{ m/s}^2$  with what velocity will it strike the ground? 2
23. Calculate the concentration of a solution in terms of mass by mass percentage prepared by dissolving 20 g of sugar in 100 g of water. 2
24. Differentiate between Rough Endoplasmic Reticulum and Smooth Endoplasmic Reticulum. Give any two points. 2
25. What is the main function of each of the following cell components? 2
- Mitochondria
  - Golgi apparatus
26. What are the functions of Stomata? (any two) 2
- (OR)
- Differentiate between Parenchyma and collenchyma on the basis of their cell wall. 2

### SECTION – C : SHORT ANSWER TYPE (3 marks each)

27. a) Newton's first law of motion is also known as law of inertia. Why?  
b) A plastic ball and a cricket ball are rolled on the floor with same velocity. Which of the two will cover larger distance before stopping? Give reason for your answer.  
c) When two bodies X and Y collide with each other, X exerts a force of 5 N on Y towards east direction. What is the magnitude and direction of the force exerted by Y on X? 3

28. State Newton's second law of motion. Define the SI unit of force. An athlete in high jump aims to fall on a soft surface and not on hard surface. Explain why. 3
29. Define uniformly accelerated motion. A train is travelling at a speed of 90 km/h. Brakes are applied so as to produce uniform acceleration of  $0.5 \text{ m/s}^2$ . Find the distance covered by the train before it comes to rest. 3
30. Give reasons for the following: 3
- Lysosomes are kind of waste disposal system of a cell.
  - If we sprinkle salt on cucumber slices, it releases water after sometime.
  - Chloroplast is a strange cell organelle.
31. Write three distinguishing features between cells of meristematic tissue and permanent tissue. 3
32. Wet clothes dry up after some time. In this case change of state from liquid to vapour takes place without reaching the boiling point. 3
- What is the above process called?
  - Explain how does the process happen at a temperature lower than the boiling point.
  - Mention any two factors which increase the rate of the above mentioned process.
- (OR)
- A substance 'A' has high compressibility and can be easily liquefied. Predict the nature of the substance.
  - What produces more severe burn, boiling water or steam? Justify.
  - Give a method to liquefy gases.
33. a) What is meant by a pure substance? 3
- b) The particles of a solute cannot be seen in a solution. Why?
- c) What is the effect of change of temperature on the solubility of a salt? 3

**SECTION – D : LONG ANSWER TYPE (5 marks each)**

34. A truck is moving on a straight road with uniform acceleration. Following table gives speed of truck at various instances of time.

Speed (m/s)	5	10	15	20	25	30
Time (s)	0	10	20	30	40	50

Plot speed-time graph. Find from the graph:

- Acceleration of truck.
  - Distance covered by truck in 50 s.
  - What would be the reading of speedometer at 50 s?
- (OR)
- A car 'A' moving at 36 km/h is applied brakes to stop the car in 10 s. Another car 'B' moving at 72 km/h stops in 5 s. On the same graph sheet plot speed-time graph for both the cars. What is the nature of motion of car 'A'? Also calculate the distance travelled by cars 'A' and 'B' before they come to rest. 5
35. a) How does an Amoeba obtain its food? 5
- b) Make a comparison and write down three ways in which plant cells are different from animal cells.
- (OR)
- Differentiate between Isotonic, Hypotonic and Hypertonic solutions.
  - Which type of cell division is involved in formation of gametes? Why is cell division necessary?
36. Give reasons for the following: 5
- Water at room temperature is a liquid.
  - We should wear cotton clothes in summer.
  - We see water droplets on the surface of a glass containing ice-cold water.
  - Solid carbon dioxide is stored under high pressure.
  - Liquids generally have low densities as compared to solids, but ice floats on water.
- (OR)
- Answer the following questions:
- The boiling point of alcohol is  $78^\circ \text{C}$ . What will be the boiling point of alcohol on the Kelvin scale?
  - Common salt when added to water gets evenly distributed in it. Which property of matter exhibited by this observation?
  - Wet clothes dry faster when kept under the fan. Explain.
  - Name the process that occurs when a drop of dettol is added to water.
  - Explain why gases exert pressure on the walls of the container in which they are stored.

**SECTION – E : CASE BASED QUESTION (4 marks)**

37. The momentum 'p' of an object is defined as the product of its mass 'm' and its velocity 'v'. That is,  $p = mv$ . Momentum has both direction and magnitude. Its direction is the same as that of velocity 'v'. Since the application of an unbalanced force brings a change in the velocity of the object, it is therefore clear that a force also produces a change of momentum.
- 37.1 What is the SI unit of momentum? 1
- 37.2 What is the momentum of a ball of mass 50 kg at its highest point when thrown up? 1
- 37.3 When an object of mass 10 kg falls from a height of 5 m, calculate the momentum with which it hits the ground. (Given acceleration =  $10 \text{ m/s}^2$ )
- (OR)
- A scooter is moving with a velocity of 25 m/s takes 5 s to stop after the brakes are applied. If mass of the scooter with the rider is 180 kg, calculate the change in momentum caused due to force applied by the brakes. 2
38. The nucleus has a double layered covering called nuclear membrane. The nuclear membrane has pores which allow the transfer of material from inside the nucleus to its outside, that is, to the cytoplasm. The nucleus contains chromosomes, which are visible as rod-shaped structures only when the cell is about to divide. Chromosomes contain information for inheritance of characters from parents to next generation in the form of DNA (Deoxyribo Nucleic Acid) molecules. Chromosomes are composed of DNA and protein. DNA molecules contain the information necessary for constructing and organising cells. Functional segments of DNA are called genes. In a cell which is not dividing, this DNA is present as part of chromatin material. Chromatin material is visible as entangled mass of thread like structures. Whenever the cell is about to divide, the chromatin material gets organised into chromosomes. The nucleus plays a central role in cellular reproduction, the process by which a single cell divides and forms two new cells.
- 38.1 What are the components of chromosomes? 1
- 38.2 Give one function of nucleus. 1
- 38.3 Define genes. Write the full form of DNA.
- (OR)
- What is the significance of pores in nuclear membrane? 2
39. In our daily life, we see a number of changes taking place around us. In some of these changes, new substances are formed. Therefore, on the basis of whether new substances are formed or not, we can classify all the changes taking place around us into physical or chemical changes. In physical change, change only in physical properties of a substance takes place. Properties like colour, fluidity, rigidity, density, melting point etc. are known as physical properties. In chemical change, one substance reacts with another substance to undergo a change in chemical composition. During the burning of a candle, actually both physical and chemical changes take place. The physical change involves the melting of wax and the chemical change involves the burning of wax into carbon dioxide and water.
- 39.1 Is rusting of iron a physical change or chemical change? 1
- 39.2 Give two properties of a substance which may change during a physical change. 1
- 39.3 Write two differences between physical and chemical changes.
- (OR)
- Write the physical as well as the chemical change taking place in burning a candle. 2