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Class 9 - Science

Date: 01-10-2025

Section A - Multiple Choice Questions

Q1. Which of the following processes requires heat energy to be released? (1 marks)

a. Sublimation
b. Fusion
c. Condensation
d. Vaporization

Q2. If an element has atomic number 12 and mass number 24, how many neutrons does it possess? (1 marks)

a. 12
b. 24
c. 6
d. 36

Q3. The cell organelle responsible for detoxifying poisons and drugs in liver cells is the: (1 marks)

a. Rough Endoplasmic Reticulum (RER)
b. Mitochondria
c. Smooth Endoplasmic Reticulum (SER)
d. Golgi Apparatus

Q4. Which quantity remains constant when a body is falling freely under gravity? (1 marks)

a. Velocity
b. Acceleration
c. Potential Energy
d. Kinetic Energy

Q5. Which phylum is characterized by having jointed appendages and segmented bodies? (1 marks)

a. Mollusca

b. Annelida
c. Arthropoda
d. Platyhelminthes

Q6. The intensity of sound is measured in units of: (1 marks)

a. Hertz (Hz)
b. Metres per second (m/s)
c. Decibel (dB)
d. Joule (J)

Section B - Fill in the Blanks

Q7. The movement of water molecules through a selectively permeable membrane is called _____. (1 marks)

Q8. A substance that contains only one type of particle (atoms or molecules) is known as a _____ substance. (1 marks)

Q9. The tendency of an object to resist changes in its state of motion or rest is called _____. (1 marks)

Q10. The formula unit mass of $NaCl$ is calculated using the atomic masses of Na (23 u) and Cl (35.5 u), resulting in _____ u. (1 marks)

Q11. The permanent tissue responsible for providing flexibility to plant parts, like leaf stalks, is _____. (1 marks)

Q12. The Earth is divided into major spheres: the atmosphere, the hydrosphere, and the _____. (1 marks)

Section C - Short Answer Questions

Q13. Why is the nucleus called the functional center of the cell? List two main functions of the nucleus. (3 marks)

Q14. Define potential energy and derive the expression for the potential energy of an object of mass 'm' raised to a height 'h'. (3 marks)

Q15. State the key differences between Parenchyma and Sclerenchyma tissues in plants. (3 marks)

Q16. A solution contains 30g of sugar dissolved in 370g of water. Calculate the concentration of the solution in terms of mass percentage. (3 marks)

Q17. Derive the first equation of motion ($v = u + at$) using the graphical method. (3 marks)

Q18. Define isotopes and isobars. Give one example of each. (3 marks)

Section D - Long Answer Questions

Q19. Explain the three states of matter (Solid, Liquid, Gas) based on their particle arrangement, kinetic energy, and intermolecular forces of attraction. (5 marks)

Q20. Describe the structure and function of the Plasma Membrane. Why is it called a selectively permeable membrane? (5 marks)

Q21. State Newton’s Law of Universal Gravitation. Based on this law, explain why the value of acceleration due to gravity (g) is greater at the poles than at the equator. (5 marks)

Q22. Calculate: (i) The formula unit mass of Sodium Carbonate (Na_2CO_3). (ii) The mass of 0.2 moles of oxygen gas (O_2). [Given Atomic Masses: Na=23 u; C=12 u; O=16 u] (5 marks)

Q23. Describe the water cycle and explain the role of condensation and precipitation in it. (5 marks)

Q24. State Newton's Second Law of Motion. Derive the mathematical formulation of the Second Law (F=ma). (5 marks)

Section F - Case Study

Q25. Read the following passage and answer the questions: (4 marks)
Organisms are grouped based on evolutionary relationship and organization complexity. The Kingdom Monera includes prokaryotic organisms (lacking a defined nucleus) like bacteria, which show tremendous diversity in nutrition (autotrophic or heterotrophic). Protista, however, includes single-celled eukaryotic organisms. These may have structures like cilia or flagella for movement. Fungi are multicellular eukaryotes but are heterotrophic and have cell walls made of chitin, distinguishing them significantly from the Kingdom Plantae.

Q26. Read the following scenario and answer the questions: Driver X applies brakes suddenly upon seeing a stationary obstacle ahead. Due to the sudden application of brakes, the passengers in the bus lurch forward sharply. Furthermore, when the bus speeds up again, the bus driver observes that the necessary force required to accelerate the bus is much higher when the bus is fully loaded compared to when it is empty. (4 marks)