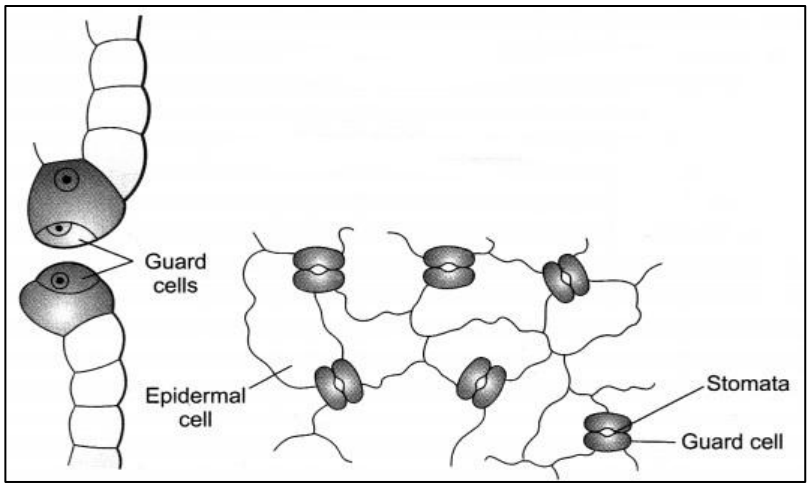
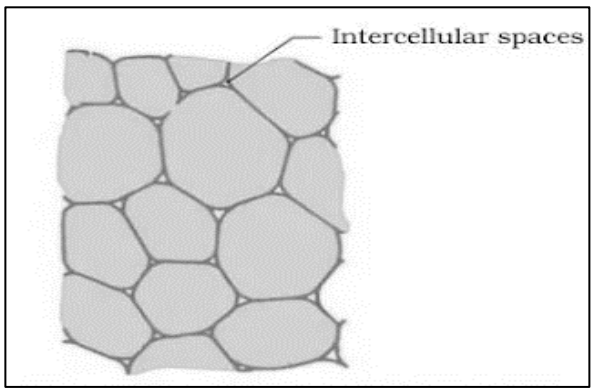
Indian School Al Wadi Al Kabir
Post- Midterm Examination (2025-2026)

Class: IX | Subject: SCIENCE (086) | Max. marks: 80
Date: 02/12/2025 | Set- I | Time: 3 Hours

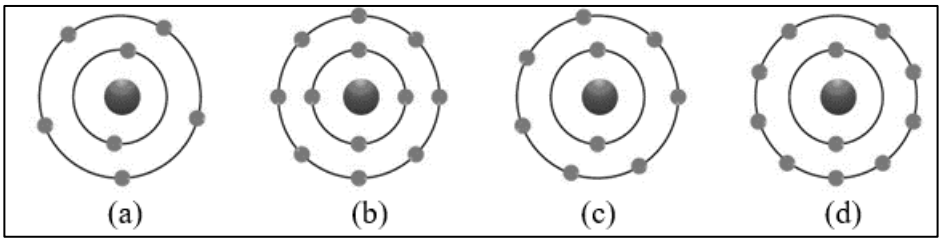
General Instructions:
Read the following instructions carefully.
(i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry, and Section C is Physics.
(ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

	Section – A	**MARKS**
1	The small pores shown in the epidermal layer are labelled as 'Stomata'. Which two key processes in plants rely on these pores?  A. Water absorption and mechanical support. B. Gas exchange and transpiration. C. Food storage and transport of water. D. Cell division and growth.	1
2	Which of the following statements best explains the structural adaptation of skin? A. The skin has only a single layer of squamous cells to allow flexibility. B. The skin has many layers of squamous cells to prevent wear and tear. C. The skin has many layers of cuboidal cells to support the body mechanically. D. The skin has a single layer of columnar cells to facilitate absorption.	1

3	A student observed a microscope slide showing plant tissue with the following features: i. Cells were living and had thin cell walls. ii. The cells were loosely packed with noticeable intercellular spaces.  Based on the observation, identify the type of simple permanent tissue and the function it performs in the given situation. A. Collenchyma – Provides mechanical support and flexibility. B. Sclerenchyma – Provides rigidity and strength. C. Parenchyma – Stores food and performs photosynthesis. D. Cork – Forms a protective outer covering of the plant body.	1
4	If a liver cell is suddenly unable to produce Smooth Endoplasmic Reticulum (SER), what two critical functions would be immediately impaired? A. Synthesis of vitamins and conversion of glucose into cellulose. B. Packaging of synthesised materials and formation of lysosomes. C. Production of ribosomes and synthesis of DNA. D. Manufacture of fat molecules (lipids) and detoxification of drugs.	1
5	Amoeba engulfs food through endocytosis, a process made possible by the flexibility of its plasma membrane. This flexibility is primarily due to the molecular composition of the membrane, which is: A. Cellulose and pectin B. Lipids and carbohydrates C. Cellulose and lignin D. Lipids and proteins	1
6	A farmer wants to grow three different crops to provide carbohydrates, proteins, and fats, respectively, for a nearby school kitchen. Which combination of crops should he plant? A. Carbohydrate – Gram, Protein – Rice, Fat – Groundnut B. Carbohydrate – Rice, Protein – Gram, Fat – Groundnut C. Carbohydrate – Wheat, Protein – Lentil, Fat – Rice D. Carbohydrate – Pea, Protein – Wheat, Fat – Soyabean	1

7	Which of the following scenarios demonstrates the effect of biotic stress on crops? A. A field of maize suffers low yield due to infestation by worms. B. Wheat yield decreases after prolonged drought. C. A tomato crop wilts because of high soil salinity. D. Frost damages a potato field in winter.	1
The following two questions consist of two statements – **Assertion** (A) and **Reason** (R). Answer these questions by selecting the appropriate option given below: **A. Both A and R are true, and R is the correct explanation of A.** **B. Both A and R are true, and R is not the correct explanation of A.** **C. A is true, but R is false.** **D. A is false, but R is true.**		
8	**Assertion (A):** The increase in thickness of the stem and root in plants occurs due to the activity of the lateral meristem. **Reason (R):** The lateral meristem is found only at the tips of roots and shoots and helps in elongation.	1
9	**Assertion (A):** The Green Revolution helped increase food-grain production in India. **Reason (R):** The Green Revolution involved the use of high-yielding varieties of crops, chemical fertilisers, irrigation, and modern farming practices.	1
10	Bone and blood are both connective tissues. Write one difference between them in terms of: (a) Nature of matrix (b) Function	2
11	**<u>Students are to attempt either option A or B.</u>** **A.**(i) Why are mitochondria and plastids considered 'strange organelles'? (ii) What is the primary function of meiosis in the reproductive organs? **OR** **B.** (i) What structural changes occur in the chromatin material of the nucleus when a cell prepares to divide? (ii) How does the Golgi apparatus work in coordination with the endoplasmic reticulum? Explain their functional relationship.	2
12	(i) What do you understand by the term photoperiod? (ii) List any two factors that are important for improving crop varieties.	2
13	(i) Draw neat, labelled diagrams of muscles: (a) Attached to bones. (b) Found in the iris of the eye, the ureters, and the bronchi. (ii) Write one difference between ligaments and tendons.	3

14	Plant cells have some structures that are not found in animal cells. Explain how each of the following organelles helps in the survival and functioning of plants: (i) Cell wall (ii) Large central vacuole (iii) Chloroplasts	3
15	During a medical emergency, several patients were given different types of saline drips. One patient suffering from severe dehydration was mistakenly given a hypotonic saline drip instead of an isotonic one, which is normally considered safe. After some time, the patient's red blood cells began swelling and bursting, causing serious complications. This was dangerous because once the red blood cells burst, they could no longer carry oxygen properly, putting the patient's life at risk. The doctors realised that giving the wrong type of fluid had a dangerous effect on the cells. In other patients, the cells either shrank or remained stable, depending on the type of solution they were given. This made the doctors think carefully about how water moves in and out of cells, and why some solutions are safer than others. A. Explain what happened to the patient's red blood cells after receiving the hypotonic saline drip and why it was dangerous? **OR** B. Compare the effect of hypertonic and isotonic solutions on red blood cells. C. Define the process by which water moves across a cell membrane. D. Which type of saline is safest for patients with dehydration?	4
16	**Attempt either option A or B.** **A.** (i) Draw a neat, labelled diagram of a nerve cell (neuron) and write its function. (ii) (a) An athlete is preparing for a marathon and is advised to maintain healthy fat levels in the body. He notices that after intense training, he has reduced fat under his skin and around his internal organs. Which tissue stores fats in the body, and what is its function? (b) Where can cartilage be found in the human body, and what role does it play? **OR** **B.** (i) Draw a neat, labelled diagram of phloem tissue. (ii) Write any two differences between xylem and phloem tissue.	5

	Section – B	
17	The electronic configuration of chlorine is 2,8,7. What is the atomic number of chlorine? A. 7 B. 10 C. 17 D. 19	1
18	Which of the following figures given below do not represent Bohr's model of an atom correctly?  A. (a) and (b) B. (b) and (c) C. (b) and (d) D. (a) and (d)	1
19	Which of the following is NOT a property of particles of matter? A. The particles of matter are extremely small. B. The particles of matter have spaces between them. C. The particles of matter attract each other. D. The particles of matter are in a stationary state.	1
20	The nucleus of an atom contains: A. Neutrons and protons B. Protons only C. Electrons and protons D. Neutrons only	1
21	Two substances, A and B, when brought together, form a substance C with the evolution of heat. The properties of C are entirely different from those of A and B. The substance C is: A. a compound. B. an element. C. a mixture. D. a solution.	1
22	Choose the correct statement from the following. A. Conversion of a solid into vapours without passing through the liquid state is called vapourisation. B. Conversion of vapours into a solid without passing through the liquid state is called deposition. C. Conversion of vapours into a solid without passing through the liquid state is called freezing. D. Conversion of a solid into a liquid is called sublimation.	1

23	Oxygen has 6 valence electrons. What is its valency? A. 6 B. 8 C. 0 D. 2	1
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24	**Assertion (A):** L shell can accommodate a maximum of 8 electrons. **Reason (R):** L shell comes after the K shell.	1
25	You are provided with a solution of substance 'X'. How will you test whether it is saturated or unsaturated with respect to 'X' at a given temperature? What happens when a hot saturated solution is allowed to cool?	2
26	**Attempt either option A or B.** **A.** (i) When 50 g of sugar is dissolved in 100 mL of water, there is no increase in volume. What characteristic of matter is illustrated by this observation? (ii) Substance 'A' has high compressibility and can be easily liquefied. It can take up the shape of any container. Predict the nature of the substance. Enlist two other properties of this state of matter. **OR** **B.** (i) Name the process which occurs when a drop of Dettol is added to water. (ii) Convert the given temperatures to the Kelvin scale. 30°C and 125°C	3
27	(i) Write the electronic configuration of sodium. (ii) Write its valency and valence electrons. (iii) Draw the atomic structure of a sodium atom. (Atomic number of Na is 11)	3
28	Salima and Sheenu have a few doubts about the number of electrons in Helium (atomic number is 2). Salima says a Helium atom has 2 electrons in its valence shell, but its valency is not 2. According to Sheenu, Helium has 2 electrons and a valency of 2. A. Write the valence electrons and valency of the Helium atom. B. Draw the atomic structure of Helium and discuss the stability of the Helium atom.	4

OR

Write the electronic configuration of the atom having one electron more than Helium. Write the name of this atom and its valency.

C. According to Bohr and Bury, the maximum number of electrons that can be accommodated in a shell is given by the formula,

(a) 2n
(b) 2n+2
(c) 2n+4
(d) $2n^2$

29 **Attempt either option A or B.** 5

A. A group of students covered an old shoebox with black paper, fixed a torch at one end, and made a viewing hole at the other. When they placed milk in a beaker, they could see the light path through it.

(a) Explain why the path of light became visible in the milk sample. Name the phenomenon involved.
(b) Same results were not observed with a salt solution. Explain.
(c) Can you suggest two more mixtures which would show the same effect as shown by the milk sample?
(d) Gel is a type of colloid. Write the dispersed phase and dispersing medium present in it?
(e) Write any two differences between the solution and suspension.

OR

B. Sudha tested the solubility of four salts, X, Y, Z and T, at different temperatures and collected the following data.

Temperature in Kelvin					
Salt dissolved	**290 K**	**313 K**	**323 K**	**343 K**	**353 K**
	Solubility				
X	22	34	40	93	109
Y	43	43	46	50	50
Z	27	30	34	37	40
T	25	38	42	54	64

(a) Which salts have the highest and lowest solubility at 323 K?
(b) How is solubility affected by temperature?
(c) Which salt shows the least change in solubility when the temperature increases? Explain.
(d) A solution contains 60 g of sugar in 480 g of water. Calculate the concentration of the solution in terms of mass by mass percentage of the solution.
(e) What is tincture of iodine?

	Section – C	
30	The initial velocity of a body is ***u***. It is under uniform acceleration ***a***. Its velocity ***v*** at any time ***t*** is given by A. $v = u\,t + \frac{1}{2}at^2$ B. $v = u + at^2$ C. $v = u$ D. $v = u + at$	1
31	According to Archimedes' principle, when a body is submerged in a liquid, its apparent weight A. decreases. B. increases. C. remains unchanged. D. may increase or decrease depending upon the material of the body.	1
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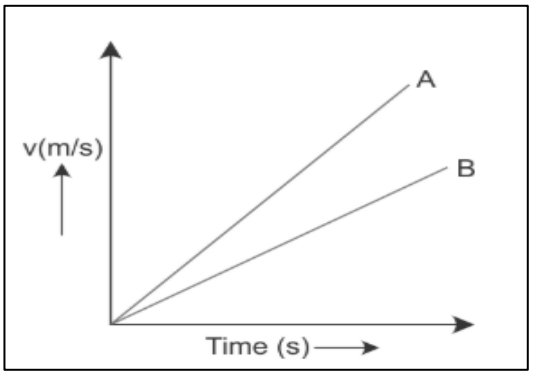
32	**Assertion (A):** A force is needed to keep an object moving with constant velocity. **Reason (R):** According to Newton's First Law, an object continues to move with uniform velocity in the absence of external force.	1
33	Two forces of 5 N and 8 N act on a body in opposite directions. What is the net force on the body? If the mass of the body is 2 kg, find its acceleration.	2
34	**<u>Attempt either option A or B.</u>** **A.** Which of the two bodies, A or B, is moving with higher acceleration, and why?  **OR** B. (i) What is the quantity that is measured by the area occupied below the velocity-time graph?	2

	(ii) What can you say about the motion of an object whose velocity-time graph is a straight line parallel to the time axis?	
35	(i) Write an expression for the work done when a force is acting on an object in the direction of its displacement. (ii) A girl is running along a circular path at a uniform speed. How much work is done by the girl? (iii) A person holds a bundle of hay over his head for 30 minutes and gets tired. Has he done some work or not? Justify your answer.	3
36	A wooden block with a mass of 2 kg rests on a table. (i) What is the thrust exerted by the block on the table? (ii) If the dimensions of the contact surface with the table are 0.1 m × 0.05 m, calculate the pressure exerted by the block on the table. (Use g = 10 m/s²)	3
37	(i) Draw a velocity–time graph for a body starting its motion with a velocity 'u' and under uniform acceleration 'a'. It acquires a velocity 'v' in time 't'. (ii) A bus starting from rest moves with a uniform acceleration of $0.1 m/s^2$ for 2 minutes. Find the speed acquired and the distance travelled.	3
38	Scientists at a space centre are preparing to launch a rocket with a mass of 5,000 kg. The rocket engines produce hot gases that are expelled downward with great force. As these gases rush downward, the rocket experiences an upward force that lifts it off the ground. During the initial phase of launch, the rocket experiences an acceleration of 15 m/s². Scientists know that understanding Newton's laws of motion is crucial for successfully launching a rocket into space. A. Which of Newton's laws explains the upward motion of the rocket? B. State the action-reaction pair involved in the rocket launch. **Attempt either subpart C or D.** C. Calculate the net upward force acting on the rocket during the initial phase of launch when it accelerates at 15 m/s². **OR** D. (i) Define momentum. (ii) The rocket expels 100 kg of gases per second at a velocity of 1000 m/s downward. Calculate the momentum of gases expelled in one second.	4
39	**Attempt either option A or B.** **A.** (i) State the universal law of gravitation. (ii) Derive an expression for the force of attraction between two bodies. (iii) What will happen to the gravitational force between two bodies if the mass of one body is doubled? (iv) A stone is dropped from a cliff. What will be its speed when it has fallen 10 m? (Take $g = 9.8 m/s^2$) **OR**	5

	B. (i) Define acceleration due to gravity. (ii) Differentiate between mass and weight of an object with respect to: (a) Definition and SI unit, (b) Whether they change with location. (iii) An astronaut has a mass of 60 kg. Calculate his weight on Earth and on the Moon. Explain why his weight is different on the Moon, even though his mass remains the same. (Take g on Earth = 10 m s^{-2}, g on Moon = 1.67 m s^{-2})	