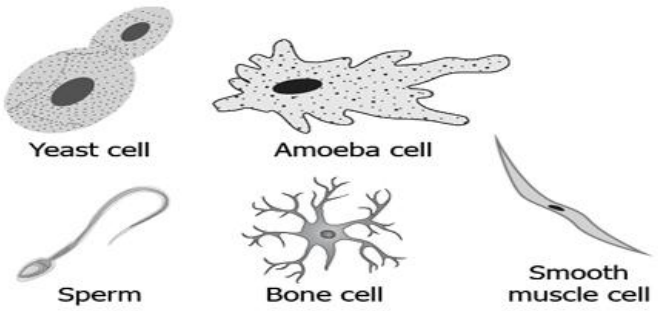
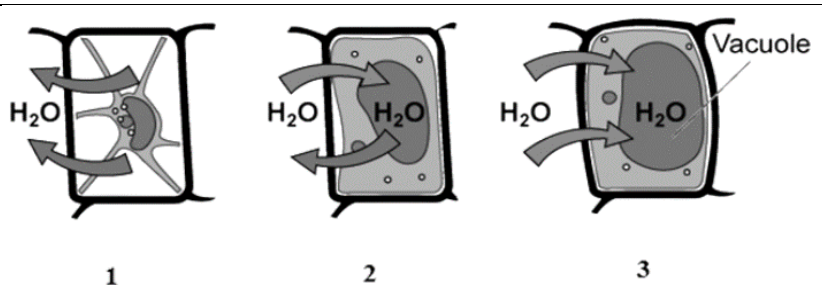
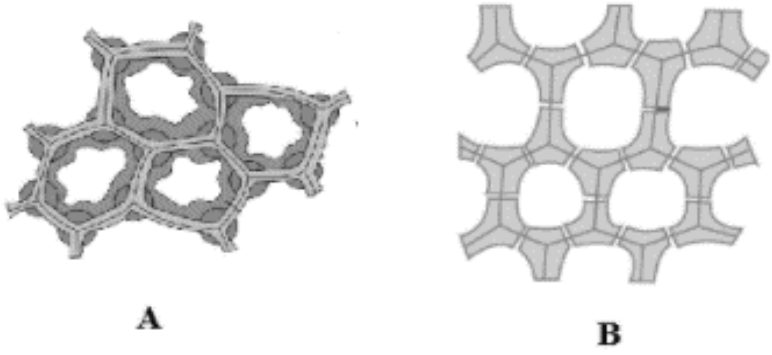
Sample Paper
Mid-term Examination

Class: IX | Subject: SCIENCE (086) Set- I | Max. marks: 80 Time: 3 hours

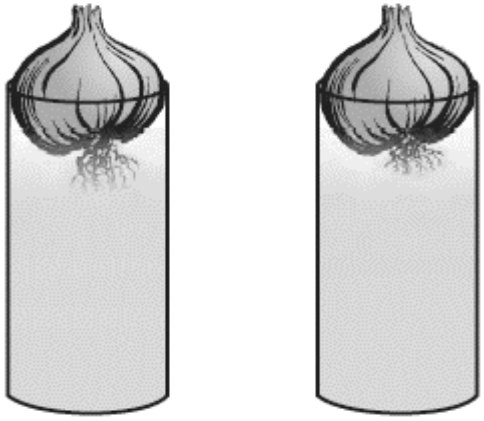
General Instructions:
(i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry, and Section C is Physics.
(ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these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

	Section – A	**MARKS**
1	The image shows different types of cells.  Based on the image, what could be the reason for the different size and shape? A. To suit the specific functions they perform. B. To store more organelles. C. To perform the same functions. D. To determine the size of the organism.	1
2	Which of these is the function of the Golgi apparatus? A. Packaging and modification of molecules. B. Energy production. C. Controlling the activities of the entire cell. D. Protein synthesis	1
3	Which statement is true about mitosis? A. Mitosis produces four daughter cells. B. Mitosis leads to the formation of gametes. C. Mitosis produces daughter cells with half the number of chromosomes. D. Mitosis takes place in the body cells.	1
4	Based on the given image, which cell condition represents plasmolysis?	1

	 A. The cell labelled 1, where the protoplasm has shrunken and pulled away from the cell wall. B. The cell labelled 2, where there is no visible change in vacuole size due to equal water movement. C. The cell labelled 3, where the vacuole has swollen because of water entry. D. The cell labelled 2, where the vacuole bursts due to excessive water intake.	
5	While playing on the beach, Riya picked up a coconut. She noticed that the outer husk was thick, rough, and fibrous. The husk of a coconut is made up of which tissue? A. Parenchyma B. Collenchyma C. Sclerenchyma D. Phloem	1
6	A gardener notices that the trunk of an old mango tree has become much thicker compared to when it was young. This increase in girth of the woody stem is mainly due to the activity of which tissue? A. Apical meristem B. Lateral meristem C. Intercalary meristem D. Parenchyma	1
7	What is the process of differentiation in meristematic cells? A. Cells continue to divide without changing their shape or function. B. Cells undergo differentiation, take up a specific role, lose the ability to divide, and form permanent tissues. C. Cells die immediately after formation. D. The cells will not take up any function and remain inactive.	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):** Amoeba engulfs food by endocytosis. **Reason (R):** The flexible plasma membrane enables engulfing food particles.	1
9	**Assertion (A):** Plants have supportive tissues containing dead cells. **Reason (R):** Dead cells in supportive tissues provide mechanical strength to keep plants upright, as they do not move.	1

10	(i) Justify the statement: "Mitochondria are the powerhouse of the cell." (ii) Explain why lysosomes are described as 'suicide bags' of the cell.	2
11	**Students to attempt either option A or B.** **A.**(i) Suppose you are given two unknown cells for observation. One is prokaryotic and the other is eukaryotic. How would you distinguish between them based on their features? (ii) Why is the inner membrane of mitochondria deeply folded? **OR** **B.** Compare the structure and functions of rough and smooth endoplasmic reticulum. In addition, state the role of the endoplasmic reticulum in membrane biogenesis.	2
12	Draw a neat and labelled diagram showing the locations of different meristems in a plant.	2
13	Plastids are vital for various cellular activities in plants. Explain the specific roles of chloroplasts, chromoplasts, and leucoplasts in the plant cell.	3
14	(i) Aquatic plants have a special tissue with air-filled spaces. What is this tissue called, and how does it help the plant survive in water? (ii) Observe the given diagrams and answer the following questions.  A B (a) Identify the tissue B. (b) Distinguish between the tissues A and B based on their cell wall. (c) Mention the importance of tissue A.	3
15	To study the role of meristematic tissue in plants, a student filled two glass jars with water. Two onion bulbs were placed on the mouths of the jars so that their roots dipped in water. The roots in both jars were observed for a few days. Their lengths were measured on Day 1, Day 2, and Day 3. On Day 4, the root tips of the onion bulb in Jar 2 were cut by about 1 cm, while the roots in Jar 1 were left untouched. The growth of roots was further observed and recorded up to Day 5.	4

Day	Observation in Jar 1 (roots intact)	Observation in Jar 2 (root tips cut on Day 4)
Day 1	Roots start growing	Roots start growing
Day 2	Roots continue to increase in length	Roots continue to increase in length
Day 3	Roots increase further in length	Roots increase further in length
Day 4	Roots continue to grow normally	Root tips cut by about 1 cm – growth stops
Day 5	Roots keep growing in length	No further growth observed



Jar 1 Jar 2

Attempt either subpart A or B.

A. Which onion bulb (Jar 1 or Jar 2) has longer roots? Give a reason.

OR

B. Mention any two characteristics of meristematic tissue.

C. Name the meristematic tissue responsible for the increase in length of onion roots.

D. Why did the roots in Jar 2 stop growing after Day 4?

16

Attempt either option A or B.

A.

(i) Draw a neat and labelled diagram of a Prokaryotic cell.

(ii)Explain the structure and functions of the nucleus in detail.

OR

B.

(i) List any two features in which plant cells differ from animal cells.

5

	(ii) Draw a neat diagram of an animal cell and label the following parts: (a) Cell membrane (b) Mitochondria (c) Nucleus (d) Cytoplasm	
	Section – B	
17	Which of the following phenomena would increase with rising temperature? A. Diffusion, evaporation, and compression of gases B. Evaporation, compression of gases, and solubility C. Evaporation, diffusion, expansion of gases D. Evaporation, solubility, diffusion, and compression of gases	1
18	Which of the following conditions is most favourable for converting gas into liquid? A. High pressure, low temperature B. Low pressure, low temperature C. Low pressure, high temperature D. High pressure, high temperature	1
19	The evaporation of water increases under the following conditions: A. increase in temperature, decrease in surface area. B. increase in surface area, decrease in temperature. C. increase in surface area, rise in temperature. D. increase in temperature, increase in surface area, and addition of common salt.	1
20	On converting 25°C, 38°C and 66°C to the Kelvin scale, the correct sequence of temperatures will be A.298 K, 311 K and 339 K B. 273 K, 278 K and 543 K C.298 K, 300 K and 338 K D.298 K, 310 K and 338 K	1
21	Which of the following is a pure substance? A. Milk B. Air C. Water (H_2O) D. Steel	1
22	Which of the following is a heterogeneous mixture? A. Vinegar B. Sugar solution	1

	C. Oil and water D. Air	
23	Which one of the following is not a property of a compound? A. It has a definite composition. B. It can be separated into its components by physical methods. C. It has properties different from its constituent elements. D. It is a pure substance.	1
The following question consists 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.**		
24	**Assertion (A):** A solution of salt in water is a homogeneous mixture. **Reason (R):** The components of a homogeneous mixture are uniformly distributed	1
25	A. We can get the smell of perfume sitting several metres away, why? B. Arrange the following substances in increasing order of force of attraction between their particles (keeping the substance having the minimum force of attraction first): Water, Sugar, Oxygen	2
26	**<u>Attempt either option A or B.</u>** **A.** (i) Classify the following into elements and compounds: (a) H_2O (Water) (b) He (Helium) (c) Cl_2 (Chlorine gas) (d) CO (Carbon monoxide) (e) Co (Cobalt) (ii) Differentiate between Physical and Chemical change. **OR** **B.** (i) State two reasons why you think air is a mixture and water is a compound.	3

	(ii) What are the three groups into which all the elements can be divided?	
27	A. Give one difference between a homogeneous mixture and a heterogeneous mixture? Give one example each. B. Give a reason: Copper metal is used for making electric wires.	3
28	Evaporation of perfume placed on your hand is an everyday example where a change of state from liquid to vapour takes place without the liquid reaching the boiling point. In the case of liquids, a small fraction of particles at the surface, having higher kinetic energy, can break away from the forces of attraction of other particles and get converted into vapour. This phenomenon, where a liquid changes into a vapour at any temperature below its boiling point, is called evaporation. A. Why does the evaporation take place at the surface of the liquids? B. If the outer surface of your hand is moistened with alcohol, you will find that it rapidly becomes dry. Why is it that while it is drying, your hand feels cool? **OR** B. How does the water kept in an earthen pot (matka) become cold during summer? C. Which of the following process/processes release heat? (i) Condensation (ii) Vaporisation (iii) Freezing (iv) Melting (a) only (i) (b) only (iv) (c) (i) and (iii) (d) (ii) and (iv)	4
29	**<u>Attempt either option A or B.</u>** A. Give a reason for the following: (a) A gas exerts pressure on the walls of the container. (b) A wooden table should be called a solid. (c) We can easily move our hands in the air, but to do the same	5

	through a solid block of wood, we need a karate expert. (d) On a hot sunny day, people sprinkle water on the roof or open grounds. (e) The water level does not change significantly when salt is dissolved in it. **OR** B. (a) Why does the smell of incense stick spread faster when it is lit compared to when it is unlit? (b) Define the term 'latent heat of fusion' of a solid. (c) Draw the 'states of matter triangle' to show the interconversion of states of matter.	
	Section – C	
30	The slope of the velocity-time graph represents: A. displacement B. distance C. acceleration D. speed	1
31	According to Newton's second law of motion, the force on an object is directly proportional to: A. its mass B. its acceleration C. its inertia D. momentum	1
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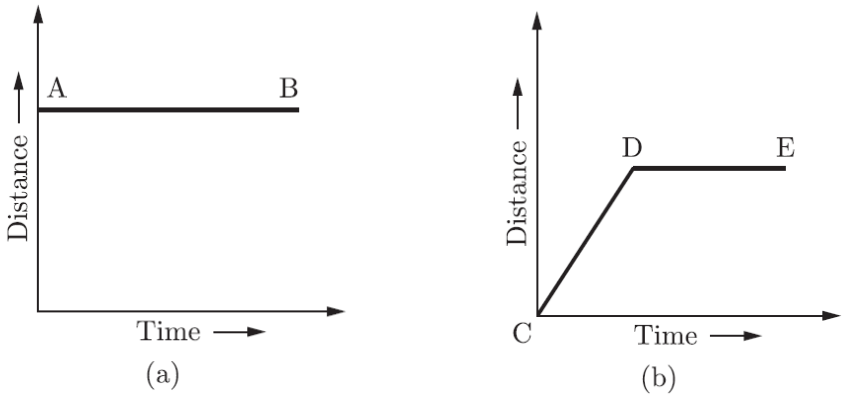
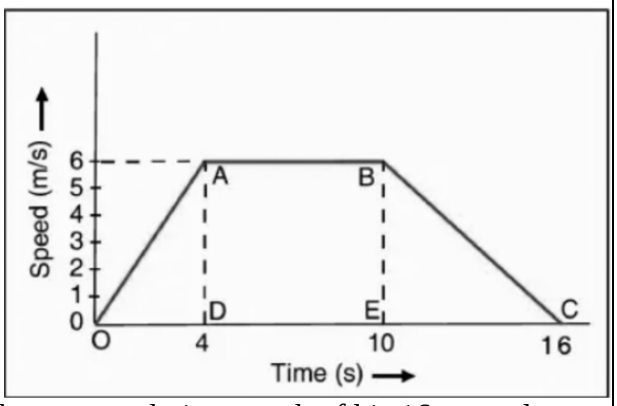
32	**Assertion (A):** An object may acquire acceleration even if it is moving at a constant speed. **Reason (R):** With a change in the direction of motion, an object can acquire acceleration.	1
33	The velocity of a particle of mass 150 g changes from 8 m/s to 12 m/s in 2 seconds. Assuming that a constant force acts on it, find the magnitude of the force.	2
34	**<u>Attempt either option A or B.</u>** A. (i) What kind of motion is represented by the graphs given alongside?	2

	 (ii) A particle moving with an initial velocity of 5 m/s is subject to an acceleration of – 2.5 m/s^2. Find the displacement travelled by the particle in the next 4.0 seconds. **OR** B. (i) Can the distance travelled by an object be smaller than its displacement? (ii) Give two examples to explain that motion is relative.	
35	(i) A car starts from rest and attains a velocity of 72 km/h in 5 seconds. Find (a) acceleration, (b) distance travelled by the car during this time. (ii) Differentiate between speed and velocity.	3
36	(i) What is momentum? Write its SI unit. (ii) A force F_1 acting on a 2.0 kg body produces an acceleration of 2.5 m/s^2. Another force of 5.0 kg produces an acceleration of 2.0 m/s^2. Find the ratio of F_2/F_1.	3
37	(i) State Newton's third law of motion with a suitable example. (ii) Why is it difficult for a fireman to hold a hose which ejects large amounts of water at a high velocity?	3
38	**Read the following and answer the questions.** Aditya started driving his car. He increased the speed for the first 4 seconds**,** then kept his car at a constant speed for the next 6 seconds. After that, he decreased the speed for another 6 seconds until the car came to rest. He drew a speed–time graph of his 16-second journey as shown in the given figure. 	4

	A. How much distance is covered during the uniform speed of the car? B. What type of motion is represented by OA and BC? **Attempt either subpart C or D.** C. Calculate the distance covered during 0 to 4 seconds and 10 to 16 seconds. **OR** D. Calculate the average speed of the car during the trip.	
39	**Attempt either option A or B.** A. (i) State Newton's 2nd law of motion. (ii) Using 2nd law, derive the relation between force and acceleration. **OR** B. A force of 12 N starts acting on a body kept at rest. Find the momentum of the body at 1sec, 2 sec and 5 sec after the force starts acting.	5