Sample Paper
Mid-term Examination
Marking scheme

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

<table>
<tr><th colspan="2">Section – A</th><th>MARKS</th></tr>
<tr><td>1</td><td>A. To suit the specific functions they perform.</td><td>1</td></tr>
<tr><td>2</td><td>A. Packaging and modification of molecules</td><td>1</td></tr>
<tr><td>3</td><td>D. Mitosis takes place in the body cells.</td><td>1</td></tr>
<tr><td>4</td><td>A. The cell labelled 1, where the protoplasm has shrunken and pulled away from the cell wall.</td><td>1</td></tr>
<tr><td>5</td><td>C. Sclerenchyma</td><td>1</td></tr>
<tr><td>6</td><td>B. Lateral meristem</td><td>1</td></tr>
<tr><td>7</td><td>B. Cells undergo differentiation, take up a specific role, lose the ability to divide, and form permanent tissues.</td><td>1</td></tr>
<tr><td>8</td><td>A. Both A and R are true, and R is the correct explanation of A.</td><td>1</td></tr>
<tr><td>9</td><td>A. Both A and R are true, and R is the correct explanation of A.</td><td>1</td></tr>
<tr><td>10</td><td>(i) Mitochondria are called the powerhouse of the cell because they release energy for the cell’s activities. (1)
(ii) Lysosomes are called suicide bags because they contain digestive enzymes which can digest the cell itself if the lysosome bursts. (1)</td><td>2</td></tr>
<tr><td>11</td><td><u>Students to attempt either option A or B.</u>
A. (i)
<table>
<tr><th>Feature</th><th>Prokaryotic Cell</th><th>Eukaryotic Cell</th></tr>
<tr><td>Nucleus</td><td>No true nucleus; DNA is in the nucleoid</td><td>True nucleus present, bounded by nuclear membrane</td></tr>
<tr><td>Membrane-bound organelles</td><td>Absent</td><td>Present (mitochondria, ER, etc.)</td></tr>
<tr><td>Size</td><td>Usually smaller</td><td>Usually larger</td></tr>
</table></td><td>2</td></tr>
</table>

Example	Bacteria	Plant and animal cells	

Any 1 difference (½ +½=1)

(ii) The inner membrane of mitochondria is deeply folded to form cristae, which **increase the surface area** for energy-producing chemical reactions/ ATP production. (1)

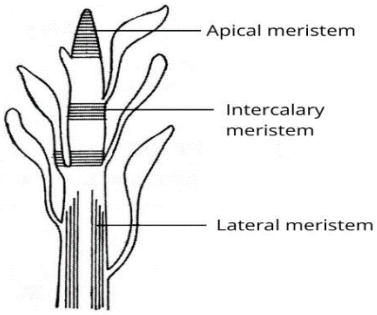
OR

B.

Feature	**Rough Endoplasmic Reticulum (RER)**	**Smooth Endoplasmic Reticulum (SER)**
Structure	The surface has ribosomes attached	Surface lacks ribosomes
Function	Helps in the **manufacture of proteins**	Helps in the **manufacture of lipids**

Role in membrane biogenesis: The proteins and lipids synthesised by RER and SER help in the building of the cell membrane. (½ X4= 2)

12



(½ X4= 2, ½- Drawing 1½- Labelling) — 2

13

Chloroplasts: They contain the green pigment chlorophyll and carry out photosynthesis, helping in the manufacture of food.

Chromoplasts: These plastids contain pigments other than chlorophyll, such as orange, red or yellow. They provide colour to flowers and fruits.

Leucoplasts: These are colourless plastids. They are mainly used for the storage of starch, oils and proteins. (1X3=3) — 3

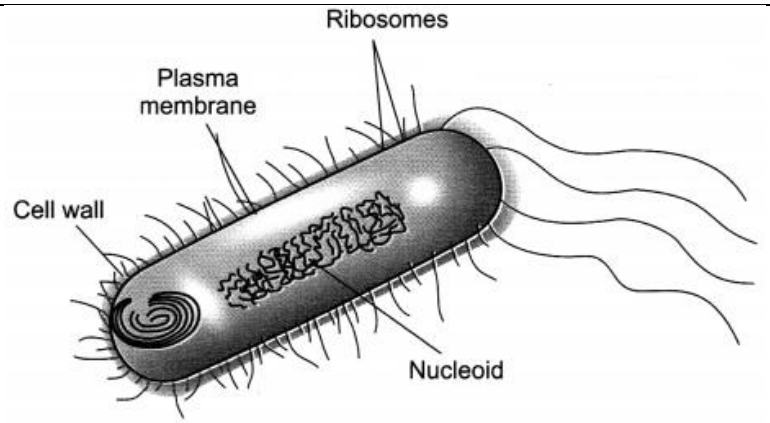
14

(i)

The special tissue with air-filled spaces is called Aerenchyma. — 3

	It helps the plant float in water and provides buoyancy. (½+½= 1) (ii) (a) The tissue B is Sclerenchyma (½) (b) Distinction based on cell wall: Collenchyma (A): Cell walls are irregularly thickened at corners, composed mainly of cellulose and pectin. Sclerenchyma (B): Cell walls are uniformly thickened with lignin, making them hard and rigid. (½+½= 1) (c) Importance of tissue A (Collenchyma): Provides mechanical support and elasticity to the plant. It helps in bending of young stems and leaves without breaking. (½)	
15	**A.** • The onion bulb in **Jar 1** has longer roots. • Reason: The root tips were intact, and growth occurs at the tips because of meristematic tissue present there. (2) **OR** **B. Characteristics of meristematic tissue (any two):** 1. Cells are small, thin-walled, and actively dividing. 2. They have a dense cytoplasm and a prominent nucleus, but no vacuoles (2) C. The meristematic tissue responsible for the increase in length of onion roots is the Apical meristem. (1) D. The roots in Jar 2 stopped growing after Day 4 because the apical meristem at the tip was removed by cutting, and hence no further cell division and elongation could occur. (1)	4
16	**<u>Attempt either option A or B.</u>** A.	5

(i)



A typical prokaryotic cell

(Drawing 1- Labelling any two parts - (½+½= 1))

(ii) **Structure of the Nucleus**

1. The nucleus has a **double-layered nuclear membrane**.
2. The nuclear membrane has **pores** that allow the transfer of material between the nucleus and cytoplasm.
3. The nucleus contains **chromosomes** (visible as rod-shaped structures during cell division).
4. **Chromosomes** are made up of **DNA and protein**.
5. **DNA molecules** carry hereditary information and instructions for cell construction and organisation.
6. Functional segments of DNA are called **genes**.
7. In a non-dividing cell, DNA is present as **chromatin material** (thread-like, entangled structures).
8. During cell division, chromatin material condenses to form **chromosomes**. (2)

Functions of the Nucleus

1. **Controls all cellular activities** by directing chemical processes in the cell.
2. **Carries genetic information** in the form of DNA, which is passed on from parents to the next generation.
3. **Regulates inheritance of characters** through genes.
4. **Plays a central role in cell reproduction**, ensuring the formation of new cells.

5. Determines the way a cell develops and the form it exhibits at maturity (influence of both nucleus and environment).

(Any 1 function- 1)

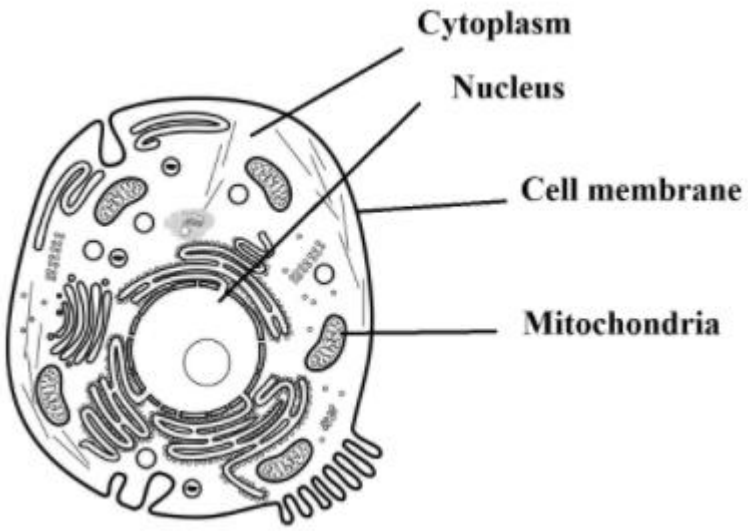
OR

B. (i)

Plant cell	Animal cell
1. The cell wall is the outermost covering on the cell. The plant cells have both cell wall and the cell membrane	1. The cell membrane or plasma membrane is the outermost covering of the cell. The animal cells do not have cell wall
2. The vacuoles are large and centrally placed.	2. The vacuoles are small and uniformly distributed in the cytoplasm.
3. There are plastids in the plant cells. The chloroplasts have chlorophyll.	3. The plastids are absent in the animal cells.
4. The lysosomes are absent in the plant cells.	4. Lysosomes are present in the animal cells. They contain digestive enzymes.
5. The cytoplasm is thin and pushed to the periphery due to central vacuole.	5. The cytoplasm is dense and granular. It is uniformly spread throughout the cell.

Any two points each - (½ X4=2)

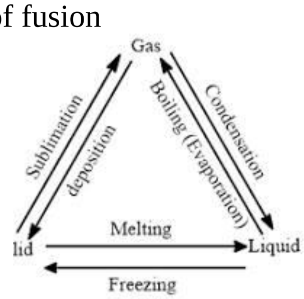
(ii)



(3-Drawing – 1 Labelling - (½ X4=2))

Section – B

17	C. Evaporation, diffusion, expansion of gases	1
18	A. High pressure, low temperature	1
19	C. increase in surface area, rise in temperature	1
20	A. 298 K, 311 K and 339 K	1
21	C. Water (H_2O)	1
22	C. Oil and water	1
23	B. It can be separated into its components by physical methods.	1
24	A. Both A and R are true, and R is the correct explanation of A**.**	1
25	A. Perfumes diffuse very fast and can reach to people sitting several metres away. B. Oxygen < Water < Sugar	1 1
26	**<u>Attempt either option A or B.</u>** A. (a) H_2O - C (Water) (b) He (Helium)- E (c) Cl_2(Chlorine gas) - E(d) CO (Carbon monoxide) - C (e) Co- Cobalt - E (ii) Physical change- No change in the composition of the matter Chemical change – Change in the composition of matter **OR** B. (i) Air has variable composition while water has fixed composition The components of the air can be separated using physical methods while the components of water cannot be separated using physical methods (ii) Metals,Non-metals and metalloids	½ x 5= 2 ½ ½ 1x2=2 1
27	A. A homogeneous mixture has a uniform composition throughout, such as salt dissolved in water. A heterogeneous mixture has a non-uniform composition with distinct phases, such as sand in water B. Cu metal conducts electricity	½ x4 =2 1

28	A. Because at the surface, the liquids have sufficient kinetic energy to break the force of attraction B. When alcohol evaporates, it absorbs heat from your hand to change from a liquid to a gas making our hand feel cold. **OR** C. Water in an earthen pot (matka) becomes cool due to the process of evaporation of water from the pores of the matka. For evaporation, it takes the heat energy from the surroundings, that is, the matka and the water. This makes the remaining water cold D. (c) (i) and (iii)	1 2
29	**<u>Attempt either option A or B.</u>** A. (a)A gas exerts pressure on the walls of its container because the gas molecules are in constant, random motion, and these molecules collide with the container's walls, exerting force and hence pressure (b) A wooden table should be called a solid because it is a rigid object with a definite shape and volume, composed of particles with fixed positions and strong intermolecular forces (c) It is easy to move your hand through air but not wood because air molecules are far apart with weak attractive forces, while wood molecules are closely packed with strong forces of attraction that resist your hand's movement (d) People sprinkle water on hot surfaces like roofs or open grounds to cool them down through evaporation of water, which absorbs a large amount of heat for vaporisation (e) The water level doesn't change significantly when a small amount of salt is dissolved because the salt ions get into the spaces between the water molecules. **OR** B. (a) The smell of a lit incense stick spreads faster because heat increases the kinetic energy of the scent particles, and diffusion occurs faster (b) The amount of heat energy that is required to change 1 kg of a solid into a liquid at atmospheric pressure at its melting point is known as the latent heat of fusion  (c)	1x5=5 1 1 3

	Section – C	
30	C. acceleration	1
31	B. its acceleration	1
32	A. Both A and R are true, and R is the correct explanation of A.	1
33	a = v-u/t = (12-8)/2 = 2 m/s^2 f = 0.150 kg x 2 m/s^2 = 0.30 N	2
34	**Attempt either option A or B.** A. (i) (a) rest (b) uniform speed and rest. (ii) s = ut + ½ at^2 = 5 x4 + ½ x (-2.5) 4^2 = 20 – 20 = 0, particle reached to the same point. OR B. (i) No (ii) two suitable examples.	2
35	(i)(a) u = 0, v = 72 km/h = 20 m/s, t = 5 sec. a = v-u/t = 20-0/5 = 4 m/s^2. (b) s = ut + ½ at^2 = ½ x 4 x 5 x5 = 50 m. (ii) two differences	3
36	(i) Momentum is the product of mass and velocity. Kgm/s (ii) We have $F = kma$. Thus, $F_1 = k\ (2.0\ kg)\ (2.5\ m/s^2)$, and $F_2 = k\ (5.0\ kg)\ (2.0\ m/s^2)$. These equations give $\frac{F_2}{F_1} = \frac{5.0 \times 2.0}{2.0 \times 2.5} = 2.$	3
37	(i)Statement third law. (ii)One example. When a fireman holds a hose, which is ejecting large amounts of water at a high velocity, then a reaction force is exerted on him by the ejecting water in the backwards direction. This is because of Newton's third law of motion. As a result of the backwards force, the stability of the fireman decreases. Hence, it is difficult for him to remain stable while holding the hose.	3

38	A. distance = area on time axis = 6 x (10-4) = 36 m B. acceleration and retardation **Attempt either subpart C or D.** C. distance, in 0 to 4 sec = area of right-angle triangle = ½ x 4 x 6 = 12 m. distance, in 10 to 16 sec = area of right-angle = ½ x 6 x 6 = 18 m. **OR** D. average speed = total distance/total time = 36 + 12 +18 /16 = 66/16 = 4.125 m/s	4
39	**Attempt either option A or B.** A. (i) statement (ii) proof, f = ma **OR** $F = \frac{p_2 - p_1}{t - 0}$ or $p_2 = p_1 + Ft = Ft.$ The momentum at $t = 1$ s is $p_2 = Ft = (12\ \text{N}) \times (1\ \text{s}) = 12\ \text{N s}.$ At $t = 2$ s, it is $p_2 = (12\ \text{N}) \times (2\ \text{s}) = 24\ \text{N s}.$ At $t = 5$ s, it is $p_2 = (12\ \text{N}) \times (5\ \text{s}) = 60\ \text{N s}.$ B.	5