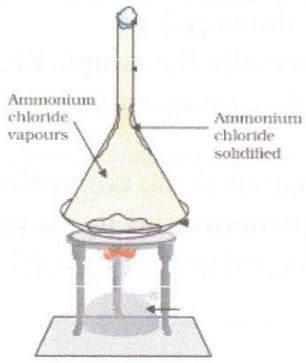
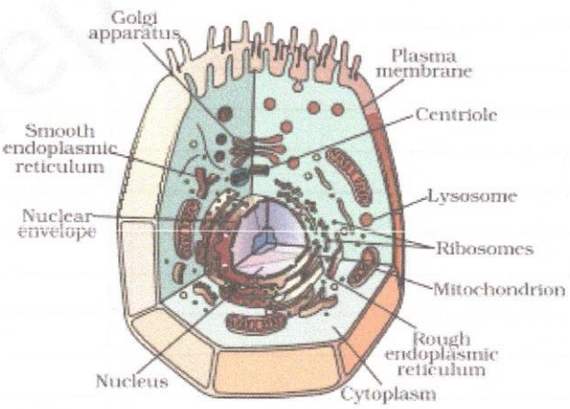
	9TH SCIENCE SEMESTER I SEPTEMBER 2025 ANSWER KEY		
Q. No	**ANSWERS**	**Marks Distribution**	**Total Marks**
1.	B	1	1
2.	A	1	1
3.	D	1	1
4.	D	1	1
5.	C	1	1
6.	B	1	1
7.	D	1	1
8.	A	1	1
9.	B	1	1
10.	A	1	1
11.	A	1	1
12.	C	1	1
13.	A	1	1
14.	C	1	1
15.	B	1	1
16.	A	1	1
17.	D	1	1
18.	C	1	1
19.	Refer to Fig. 1.7: Sublimation of ammonium chloride on page 8.  	1 mk for diagram ½ mk each for labelling	2
20.	(i) Acceleration between Points C and D From the graph: Time = $t_2 - t_1$= 5- 3 = 2s u=30 m/s v=15 m/s Formula for acceleration: a= $\frac{v-u}{}$= $\frac{15-30}{}$= $\frac{-15}{}$= $-7.5 m/s^2$	(½ +½)	2

	t 2 2 (ii) Distance Travelled Between 0s and 3s = Area of triangle = ½ base x height = ½ x (3-0) x (30-0) = ½ x 3 x 30 = 45 m	 (½) (½)	
21.	Refer to Fig. 5.5 on page 63.  	1 mk for diagram ½ mk each for labellin g	2
22.	(i) The gas is liquefied by **increasing the pressure** and **decreasing the temperature**	(1)	2
	(ii) Gases are highly compressible because the **particles in a gas are far apart** creating a lot of empty space between the gas particles, allowing the gas to be compressed into a smaller volume when pressure is applied.	(1)	
23.	**If a portion of the cell membrane gets damaged :** The **Endoplasmic Reticulum (ER)**, especially the **rough ER**, produces membrane proteins and lipids that are essential components of the cell membrane	(1)	2
	These proteins and lipids are then transported to the **Golgi Body** where it **modifies and packages these proteins and lipids into vesicles**. These vesicles move to the damaged area of the cell membrane for its repair	(1)	
	OR		
23.	**If the mitochondria in an animal cell stop functioning:** The cell will stop producing energy (ATP)	(1)	
	Cellular activities that require ATP, such as **active transport**, **will stop**, disrupting essential functions and eventually causing cell death	(1)	
24.	(i)Chilled water at **0°C has latent heat of fusion stored in its molecules** and hence cannot cool down the drink as well as ice	(1)	2

	although both are at the same temperature.		
	(ii) When food is hot, its particles have **higher kinetic energy** and move faster. This causes some of the molecules to **evaporate and diffuse into the air**. In frozen food, particles have low kinetic energy, so fewer molecules evaporate and diffuse, making the smell weaker	(1)	
25.	(i) $s = 30 + 40 = 70$ m $t = 35$ s $v = \frac{s}{t} = \frac{70}{35}$ $= 2$ m/s	 (½) (½)	
	(ii) Displacement = AC $AC^2 = AB^2 + BC^2$ $= 30^2 + 40^2$ $AC^2 = 900 + 1600 = 2500$ $AC = \sqrt{2500}$ $= 50$m N.E	 (½) (½)	2
26.	a) Since parenchyma cells have **large intercellular spaces**, they would allow easy entry of pathogens and air, increasing the risk of infection and water loss. **OR** b) Since parenchyma **cells are living**, they will not be able to provide mechanical strength thus making the plant susceptible to mechanical injury. **OR** b) The plant would **lack cork formation** (which is made of dead, protective cells), so it would lose the tough, waterproof outer layer needed to protect against environmental damage and prevent dehydration.	any 2 points – 1 mk each	2
27.	**ANY 1 POINT**	1	2

Balanced Forces	**Unbalanced Forces**
Do **not change** the state of motion of an object.	**Change** the state of motion of an object.
The **net force is zero**.	The **net force is not zero**.
The object remains at rest or moves with constant velocity.	The object may **accelerate, decelerate**, or **change direction**
Are equal in magnitude , opposite in direction	Are unequal in magnitude , opposite in direction

	(ii) Part 1 According to **Newton's First Law of Motion**, an object remains at rest or in uniform motion unless acted upon by an external unbalanced force. **OR** This is based on Newton's First Law of Motion **OR** It is advisable to tie luggage firmly on top of a bus due to the principle of inertia. **Part 2** When the bus suddenly starts, stops, or turns, unbalanced forces act on the luggage. Due to **inertia**, the luggage tends to maintain its state of motion (**or resist these changes** in motion) and may slide or fall off. Therefore, it must be tied firmly to prevent it from falling. **OR** When a bus starts moving, the luggage on top, due to inertia of rest, initially wants to remain at rest and can slide backward. **OR** When a bus brakes, the luggage, due to inertia of motion, tends to keep moving forward and can slide off the front. **OR** When a bus turns, the luggage experiences a force that tries to keep it moving in a straight line, potentially causing it to fall sideways.	($^1/_2$) ($^1/_2$)	
28.	**(i) Acetone** will evaporate faster at room temperature. This is because **acetone has a lower boiling point (56°C)** and **weaker intermolecular forces** compared to glycerine. So its particles require **less energy** to break away from the **intermolecular** forces of attraction and turn into vapour	(1)	
	(iii) (a)**Increase Surface Area:** Pour the liquid into a shallow dish or tray to expose more surface to air. **OR** (b)**Increase Air Flow:** Use a fan or keep the substance in a well-ventilated area. Moving air carries away vapour particles, allowing more to evaporate. **OR** (c)**Reduce Humidity:** Place the liquid in a dry environment (e.g., air-conditioned or dehumidified room). Dry air absorbs more vapour than humid air. Note : (Increasing temperature is not an option as question states "while maintaining the liquids at room temperature")	any 1 point – 1 mk each	2

	OR		
28.	(i) When the humidity level is **86%**, it means the **air is holding almost all the water vapour it can. Increase in humidity reduces the rate of evaporation**. So sweat can't evaporate quickly leaving us feeling hot and sweaty.	(1)	
	(ii) Cotton is a **good absorber of water**. It will help to absorb the sweat on a humid day and keep the body as dry as possible.	(1)	
29.			2

Feature	Leucoplasts	Chloroplasts	
(i)Composition	Colourless plastids containing starch, oils, or proteins. They lack pigments	Contain chlorophyll and other green pigments	(1) (1)
(ii) Function	Involved in storage	Involved in photosynthesis	

30.	**(i) When a person dives into the water, they push the water downwards to come up to the surface.** According to **Newton's Third Law of Motion**, *for every action, there is an equal and opposite reaction.* When the person pushes the water **downward (action)**, the water pushes them **upward (reaction)** with an equal force, helping them rise to the surface.	($^1/_2$) ($^1/_2$)	2
	(ii) When a boxer receives a punch, he leans back or moves with the punch to reduce its impact. *According to Newton's 2nd Law of motion, "The rate of change of momentum of an object is directly proportional to the applied force."* By increasing the time of impact the rate of momentum is reduced and hence less force is transferred to the body, minimizing injury.	($^1/_2$) ($^1/_2$)	
31.	**Activity: Sprint Start Challenge** Sport: 100m Sprint Law: Newton's 2nd Law – Force = Mass × Acceleration Steps: Mark a 10m track using cones. Round 1: Students run 10m normally. Record time. Round 2: Students push off the ground harder. Record time again. Explanation:		

	When students push harder, they apply more force, which increases acceleration (mass is constant). **OR** **Sport: Cricket** Law: Newton's 2nd Law – Force = Mass × Acceleration Steps: Set up a stumps target at a short distance (e.g., 10 meters). Round 1: Bowlers bowl at normal speed. Measure the time from release to hit (or use visual judgment). Round 2: Bowlers focus on using more arm and body force to bowl faster. Observe speed and impact. Explanation: When bowlers use more force, the ball accelerates more, so it travels faster. Note: Any other relevant, correct, and context-specific answer that addresses the question should also be accepted.		(2)
	OR		
	Activity: Balloon Jet Race Law: Newton's 3rd Law – For every action, there is an equal and opposite reaction. Items Used: (i) Balloon (iii) String (iv) Straw		
	Steps: Thread the straw through a long string. Tie the string tightly between two chairs or walls (horizontal and stretched). Inflate the balloon (don't tie it), tape it to the straw, and hold the balloon closed. Let go of the balloon and watch it race along the string. Explanation: Air rushes out of the balloon (action). The balloon moves in the opposite direction (reaction). This shows Newton's 3rd Law — the force of the air backward pushes the balloon forward. **OR** **Activity: Push and Roll Challenge** Law: Newton's 3rd Law – For every action, there is an equal and opposite reaction.		

	Items Used: (ii) Two skateboards Steps: Two students stand facing each other on separate skateboards. They place their hands together (like a gentle push pose). On the count of 3, they push against each other at the same time. Both students roll backward in opposite directions. Explanation: One student applies a force on the other (action). The second student pushes back with equal force (reaction). Both move in opposite directions, showing equal and opposite forces. Note: Any other relevant, correct, and context-specific answer that addresses the question should also be accepted.		
32.	The statement is **partially incorrect**. (a)Your **mass remains the same** everywhere on Earth because mass is the amount of matter in a body, and it **does not change** with location or gravity.	(1)	
	Your weight does not remain exactly the same everywhere on Earth. Weight depends on gravitational force (W = mg), and gravitational acceleration (g) is slightly greater at the poles than at the equator because the distance from the poles to the centre of the earth is less than from the equator to the centre of the earth. So, your weight may be slightly higher at the poles than at the equator.	(1)	2
33.	$u = 144 \text{ km/h} = 144 \times \frac{5}{18} = 40 \text{ m/s}$ $v = 0 \text{ m/s}$ $a = g = -10 \text{ m/s}^2$ Maximum height h = s (i) to find out maximum height $v^2 - u^2 = 2as$ $0 - 40^2 = 2 \times (-10) \times s$ $-1600 = -20s$ $S = \frac{1600}{20} = 80 \text{ m}$	(1) ($\frac{1}{2}$) ($\frac{1}{2}$)	

	(ii) Total time to return to the same point: Time taken to reach maximum height $t = \frac{v - u}{a} = \frac{0-40}{-10} = \frac{-40}{-10} = 4$ s Total time = time up + time down = 4 s + 4 s = 8s	(½) (½)	
	OR		
33	Weight (on Earth) = 200 N Length = 0.5 m Width = 0.2 m Height = 0.1 m **(i) Pressure on the largest face (0.5 m × 0.2 m):** $= \frac{\text{force}}{\text{Area}} = \frac{200}{0.5 \times 0.2} = \frac{200}{0.1} = 2000$ Pa **(ii) Pressure on the smallest face (0.5 m × 0.1 m):** $= \frac{\text{force}}{\text{Area}} = \frac{200}{0.5 \times 0.1} = \frac{200}{0.05} = 4000$ Pa **(iii) Weight on the Moon:** The Moon's gravity is **1/6th** that of Earth's. Weight on Moon= $\frac{200 \text{ N}}{6} = 33.33$ N	(1) (1) (1)	3
34.	(i) **ANY 1 POINT** **Cardiac muscles** / **Skeletal muscles** Branched / Unbranched Uninucleate / Multinucleate	(1)	3
	(ii) a) Lifting a book – Skeletal muscle b) Movement of food down the oesophagus – Smooth muscle	(½) (½)	
	iii) Smooth muscles are called involuntary muscles because they function without our conscious control	(1)	
	OR		

34 **(i)**

ANY 1 POINT			
Feature	**Sclerenchyma**	**Collenchyma**	
Cell Wall Composition	Thick walls with lignin	Thickened walls with cellulose	
Thickness Pattern	Uniformly thickened throughout the cell wall	Thickened at the corners only	
Rigidity	Provides high mechanical strength	Provides flexible support	
Nature of Cells	Dead at maturity	Living cells	

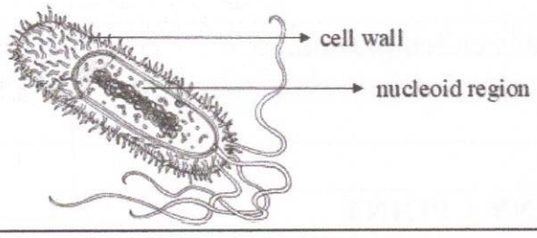
(1)

(ii) In lotus stems, parenchyma is modified into aerenchyma, which has large air spaces to help the plant float on water (1)

(iii)In desert plants, the epidermis is modified to have a **thick waxy coating (cuticle)** to **prevent water loss** through evaporation. (1)

Other acceptable answers :
a) Sunken stomata
b) Multiple layers of cells

35. Refer to Fig. 5.4 of a Prokaryotic cell on page 62



1 mk for diagram
½ mk each for labelling

ANY ONE POINT		
Feature	**Prokaryotic Cell**	**Eukaryotic Cell**
Nucleus	Nucleus is absent; genetic material lies freely in the cytoplasm	Well-defined nucleus with a nuclear membrane
Size	Generally small (1–10 μm)	Generally larger (10–100 μm)
Cell Organelles	Membrane-bound organelles are	Membrane-bound organelles like

(1)

3

		absent	mitochondria, ER, Golgi are present		
	chromosom e	Single Circular	Multiple Linear		
36.	(i) Density of metal = 8000 kg/m³ Density of water = 1000 kg/m³ Relative Density = Density of metal / Density of water = 8000 / 1000 = 8			(1)	3
	(ii) Since the relative density is greater than 1, the metal will sink in water			(1)	
	(ii) Archimedes' principle is used in : a) designing ships and submarines b) designing lactometers to determine the purity of a sample of milk c) hydrometers used for determining density of liquids			any 1 point for 1 mk	
37.	(i)			(1)	4
	(ii) One function of areolar tissue: Areolar tissue helps in a) filling spaces between organs b) providing support to internal organs c) repair of damaged tissues			(1)	
	(iii) a)The fluid matrix in blood is called plasma. Plasma contains water, proteins, salts, nutrients, hormones, and waste materials.			(½) (½)	
	(iv)			(1)	
38.	**Mass of car (m)** = 1000 kg **Initial velocity (u)** = 72 km/h = 72×5/18 =20m/s **Final velocity (v)** = 0 (since it comes to rest)			(½) (½)	

ANY 1 POINT	
Tendon	**Ligament**
Connects muscles to bones	Connects bones to bones
Less elastic	More elastic

ANY 1 POINT	
Matrix of Bone	**Matrix of Cartilage**
Rich in calcium and phosphorous	Made up of proteins and sugars
Hard and rigid	soft and flexible

	Time (t) = 4 seconds **(i) Calculate the force exerted by the tree on the car** $a=\frac{v-u}{t}=\frac{0-20}{4}=$ $=-5\ m/s^2$ Now, apply **Newton's Second Law**: $F=m\times a=1000\times(-5)$ $=-5000\ N$ **(ii) Calculate the distance the car travels after hitting the tree** Use the equation: $s=ut+\frac{1}{2}at^2$ $s = 20 \times 4 + \frac{1}{2} \times (-5)\times(4)^2$ $=80-40$ $=40\ m$ $s = 40m$	($\frac{1}{2}$) ($\frac{1}{2}$) ($\frac{1}{2}$) ($\frac{1}{2}$) ($\frac{1}{2}$) ($\frac{1}{2}$)	4
39.	$u=0\ m/s$ $v=9\ m/s$ $a=1.5\ m/s^2$ **(i) Time taken to reach 9 m/s** Use the equation: $v=u+at$ $9=0+1.5t$ $t=\frac{9}{1.5}=6$ seconds **(ii) Distance covered in this time** Use the equation: $s=ut+\frac{1}{2}at^2$ $s=0 \times 6 + \frac{1}{2} \times 1.5\times6^2$ $=0.75\times36$ $=27\ m$ **(iii)Average velocity** $\frac{u+v}{2}=\frac{0+9}{2}$ $=4.5m/s$	($\frac{1}{2}$) ($\frac{1}{2}$) ($\frac{1}{2}$) ($\frac{1}{2}$) ($\frac{1}{2}$) ($\frac{1}{2}$)	

(iv) (1)

ANY 1 POINT		
Feature	**Uniform Motion**	**Non-uniform Motion**
Definition	Motion in which an object covers equal distances in equal intervals of time	Motion in which an object covers unequal distances in equal intervals of time
Speed	Speed remains constant	Speed is not constant; it changes
Acceleration	Zero acceleration	Acceleration is present (positive or negative)

4

OR

Car:
u=0m/s
s=450 m
t=20s
a = ?

Motorbike:
Starts from same point, but **2 seconds later**
Catches up **at the 20th second** of car's motion → So motorbike travels for 20−2=18 s
Covers same distance s=500 m

(i) Find the acceleration of the car
Use the formula:
$s=ut+\frac{1}{2}at^2$
$450=0 \times 20 +\frac{1}{2} \times a \times (20)^2$
$450 = 0 + \frac{1}{2} \times 400a$ (½)
$450 = 200a$
$a = \frac{450}{200} = 2.25 m/s^2$ (½)

(ii) Find the speed of the motorbike
Since the motorbike travels the same 500 m in 18 seconds with **constant speed**, use:
$Speed = \frac{Distance}{Time}$
$= \frac{450}{18}$ (½)
$= 25 m/s$ (½)

	(iii) Final velocity of the car v=u+at =0+2.25×20 =45m/s	 (½) (½)	
	(iv) **ANY 1 POINT** **Feature** / **Distance** / **Displacement** Definition: Total path length covered by an object / The shortest straight-line distance between initial and final positions Type of Quantity: Scalar (has magnitude only) / Vector (has both magnitude and direction) Value: Always positive and can be greater than or equal to displacement / Can be positive, negative, or zero	(1)	

KINDLY NOTE: ACCEPT ANY OTHER VALID ANSWERS FOR ALL THE QUESTIONS