INDIAN SCHOOL AL WADI AL KABIR

MIDTERM (2023 - 24)

Class: IX | Sub: **SCIENCE** | Max Marks: 80

Date: 24.09.2023 | Set - II | Time: 3 hours

General Instructions:

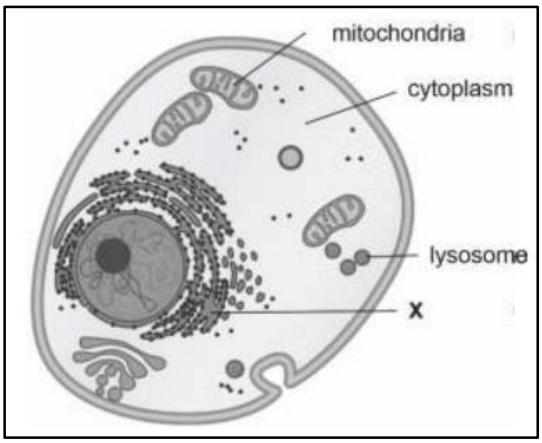
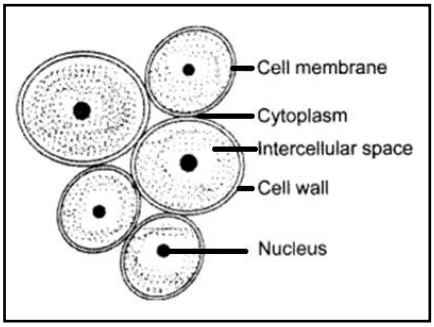
i. This question paper consists of 39 questions in 5 sections.
ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
iii. Section A consists of 20 objective-type questions carrying 1 mark each.
iv. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
v. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts

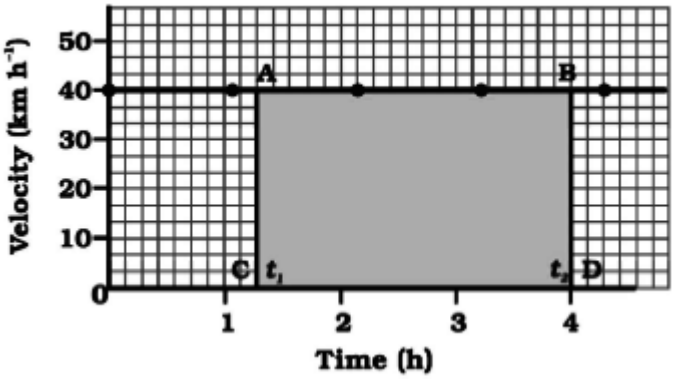
SECTION - A

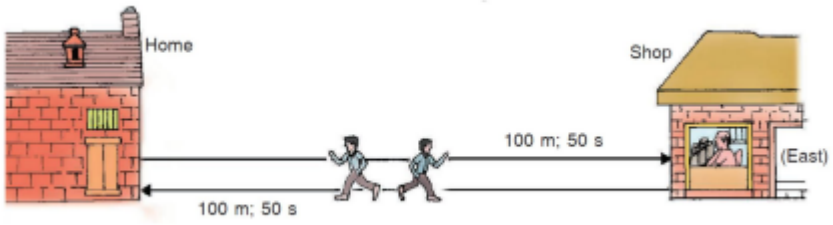
Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

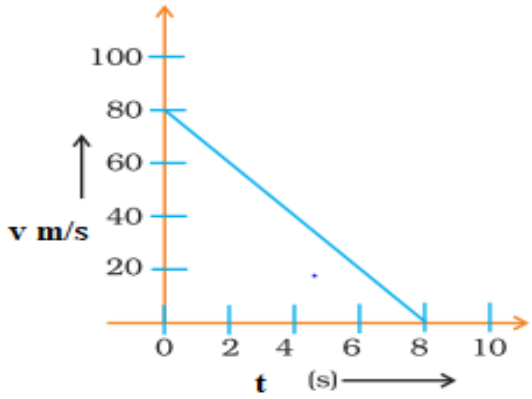
Q. No	Questions	Marks
1	Which of the following statements are true for pure substances? (i) Pure substances contain only one kind of particles. (ii) Pure substances may be compounds or mixtures. (iii) Pure substances have the same composition throughout. (iv) Pure substances can be exemplified by all elements other than nickel. (a) (i) and (ii) (b) (i) and (iii) (c) (iii) and (iv) (d) (ii) and (iii)	1
2	Two chemical substances X and Y combine together to form a product P, which contains both X and Y. $X + Y \rightarrow P$ X and Y cannot be broken down into simpler substances by simple chemical reactions. Which of the following statements concerning X, Y and P are correct? (i) P is a compound (ii) X and Y are compounds	1

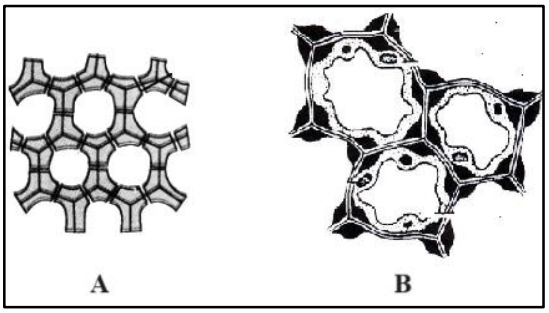
	(iii) X and Y are elements (iv) P has a fixed composition (a) (i), (ii) and (iii) (b) (i), (ii) and (iv) (c) (ii), (iii) and (iv) (d) (i), (iii) and (iv)	
3	A student takes some water in a beaker and heats it over a flame to determine the boiling point of water. He keeps on taking temperature readings. He observes that the temperature of water: (a) Keeps on increasing regularly (b) First increases slowly, then decreases rapidly and eventually becomes constant. (c) First increases gradually and then becomes constant. (d) keeps on increasing irregularly	1
4	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
5	Which one of the following sets of phenomena would increase on raising the temperature? (a) Diffusion, evaporation, compression of gases (b) Evaporation, compression of gases, solubility (c) Evaporation, diffusion, expansion of gases (d) Evaporation, solubility, diffusion, compression of gases	1
6	Materials existing as liquids have: (a) Boiling point and melting point above room temperature. (b) Boiling point and melting point below room temperature. (c) Boiling point above room temperature and melting point below room temperature. (d) None of the above.	1
7	Which of the following causes the temperature of a substance to remain constant while it is undergoing a change in its state? (a) Latent heat (b) Lattice energy (c) Loss of heat (d) None of these	1

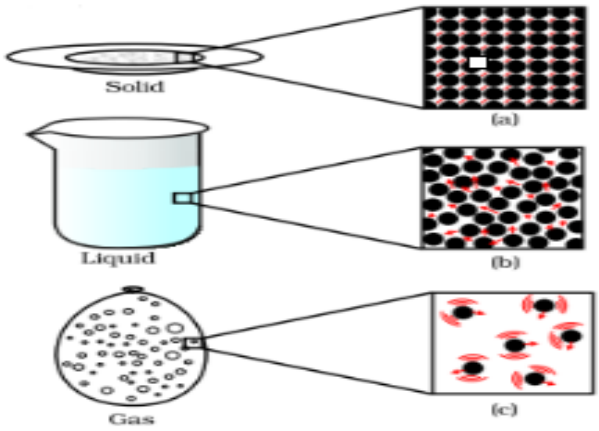
8	The diagram shows an animal cell with some of its organelles. **X** is also a cell organelle.  What does **X** represent in the diagram? (a) Nucleus (b) Chromosomes (c) Golgi apparatus (d) Endoplasmic reticulum	1
9	In which of the following case you will observe the phenomenon of plasmolysis? (a) Plant cell kept in hypotonic solution (b) Plant cell kept in hypertonic solution (c) Plant cell kept in isotonic solution (d) Plant cell kept in distilled water	1
10	Given below is the diagram showing the structure of parenchyma cell.  Which markings are **<u>wrong</u>**? (a) Cell membrane and nucleus (b) Intercellular space and cytoplasm (c) Nucleus and cell wall (d) Cell wall and cell membrane	1
11	Substances like carbon dioxide or oxygen can move across the cell membrane by a process called: (a) Diffusion (b) Osmosis	1

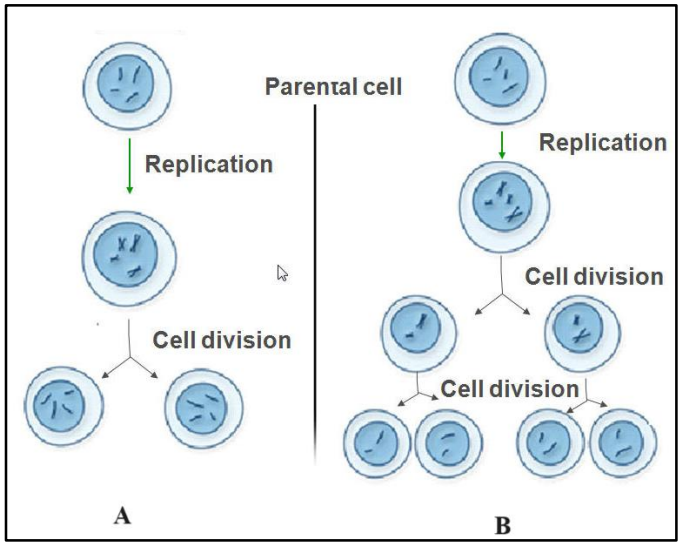
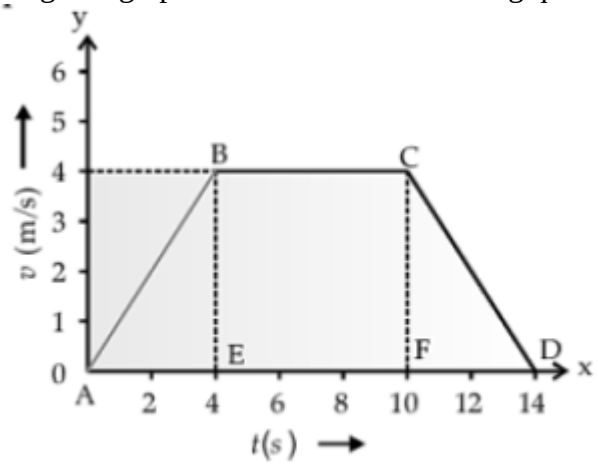
	(c) Transportation (d) Circulation	
12	Find out **incorrect** sentence. (a) Parenchymatous tissues have intercellular spaces. (b) Collenchymatous tissues are irregularly thickened at corners. (c) Apical and intercalary meristems are permanent tissues. (d) Meristematic tissue, in its early stage, lacks vacuoles.	1
13	The following graph represents  (a)the body is at rest (b)the body is moving with uniform velocity (c)the body is moving with uniform acceleration (d)the body is moving with a variable acceleration	1
14	Ravi is enjoying a ride on a merry-go-round which is moving with a constant speed of 20 ms^{-1}. It implies that he is (a) at rest (b) moving with no acceleration (c) in accelerated motion (d) moving with uniform velocity	1
15	Which cell organelle plays a crucial role in detoxifying many drugs and poisons in a cell? (a) Golgi apparatus (b) Lysosomes (c) Smooth endoplasmic reticulum (d) Plastids	1
16	Small pores on the epidermis of the leaf are called ____ which are enclosed by kidney shaped cells called _____. (a) Stomata, sclerenchyma cells (b) Cuticle, guard cells. (c) Cuticle, stomata (d) Stomata, guard cells	1
Q. no 17 to 20 are Assertion - Reasoning based questions. These consist of two statements – Assertion (A) and Reason (R). Answer these questions 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		
17	**Assertion:** Constituents of a compound cannot be separated by simple physical methods. **Reason**: The properties of compounds are same as the properties of its constituents.	1
18	**Assertion:** Leucoplasts store starch, oil and protein granules. **Reason**: Chloroplasts are not important for photosynthesis.	1
19	**Assertion**: The forces are said to be balanced, if net force is zero **Reason**: Balanced force is responsible for change in position or state of an object	1
20	**Assertion:** Water hyacinth, an aquatic plant can float on the surface of water. **Reason:** Aerenchyma tissue present in water hyacinth help them float.	1
SECTION – B Q. no. 21 to 26 are very short answer questions		
21	Give reason for the following observations. a. Naphthalene balls disappear with time without leaving any solid. b. We can get the smell of perfume sitting several meters away.	2
22	Draw a neat labelled diagram of prokaryotic cell.	2
23	Differentiate between the outermost covering in plant cells and animal cells. **OR** Why are lysosomes known as suicidal bags of a cell?	2
24	a. State Newton's third law of motion. b. A bullet, thrown with a hand can be stopped easily, but it may kill a person when fired from a gun, why?	2
25	Suppose the boy first runs a distance of 100 metres in 50 seconds in going from his home to the shop in the East direction, and then runs a distance of 100 metres again in 50 seconds in the reverse direction from the shop to reach back home from where he started  Find the speed and velocity of the boy. OR a. Define acceleration and write its SI unit. b. Draw a velocity time graph for a uniformly accelerated motion	2
26.	State any two point of differences each for xylem and phloem.	2

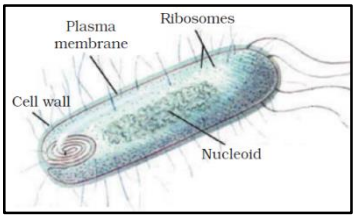
	SECTION - C Q.no. 27 to 33 are short answer questions.	
27	Is the interconversion of three states of matter possible? Illustrate with a schematic diagram.	3
28	Discuss the various factors which affect the rate of evaporation. Latent heat of vaporisation of two liquids A and B is 100 J/kg and 150 J/kg respectively. Which one can produce more cooling effect and why? OR Define an element. How are elements classified? Give an example each.	3
29	a) Explain the structure of mitochondria with special reference to its membrane coverings. b) How is endoplasmic reticulum important for membrane biogenesis?	3
30	a. Define uniform circular motion b. Calculate the distance travelled when the body moving at 5m/s changes its velocity to 10m/s with the acceleration of $5m/s^2$	3
31	a. Name the property by virtue of which a body resists the change in its state of rest or of motion b. State Newton's first law of motion c. Explain why some of the leaves may get detached from a tree if we vigorously shake its branch?	3
32	Velocity versus time graph of a ball of mass 0.1kg rolling on a concrete floor is shown below. Calculate the acceleration and the frictional force of the floor on the ball? 	3
33	a) Draw a labelled diagram showing the section of a phloem tissue in a plant. b) Intercellular spaces are absent in sclerenchyma tissues. Give reason.	3
	SECTION - D Q.no. 34 to 36 are Long answer questions.	
34	a) Write any three differences between compound and mixture. b) Classify the following into compounds and mixtures: soil, Calcium carbonate, air, water OR	5

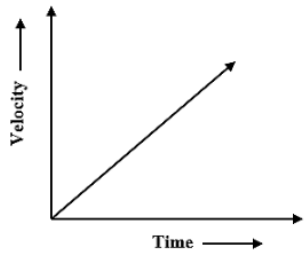
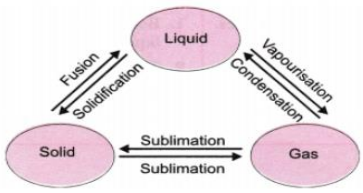
	a) Differentiate between physical and chemical change. Give one example of each. b) List any two properties for each of the following case of metals which makes them available to be used as (i) wires for electrical connections (ii) Utensils for cooking food	
35	a) Draw a labelled diagram showing the location of meristematic tissue in plant body. b) Explain the different types of meristematic tissue. **OR** a) Identify the tissues labelled **A** and **B.** Distinguish between them based on their cell wall.  b) How does the cork act as a protective tissue?	5
36	a. State Newton's second law of motion. b. Using Newton's law of motion, derive the relation between force and acceleration. c. Two objects A and B, having mass 100 kg and 75 kg, moving with velocity 40 km/h and 6 km/h respectively. Answer the following: i. Which will have greater inertia? explain ii. Which will have greater momentum? explain OR a. Name the physical quantity that measures inertia. Give its SI unit b. It is necessary to run along with the moving bus in the same direction of the bus, while alighting from the bus. Give reasons. c. A car starts from rest and rolls down a hill with constant acceleration. It travels a distance of 800 m in 10 seconds. Find its acceleration. Also, find the force acting on it if its mass is 800 kg.	5
SECTION – E Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.		
37	Gases are highly compressible as compared to solids and liquids. The liquefied petroleum gas (LPG) cylinder that we get in our home for cooking or the oxygen supplied to hospitals in cylinders is compressed gas.	4

	Compressed natural gas (CNG) is used as fuel these days in vehicles. The liquid takes up the shape of the container in which they are kept. Liquids flow and change shape, so they are not rigid but can be called fluid. Solids and liquids can diffuse into liquids. The aquatic animals can breathe underwater. The rate of diffusion of liquids is greater than solid.  (a) Arrange the following substances in the increasing order of forces of attraction between the particles –water , sugar , carbon dioxide	
	(b) Give one reason to justify water at room temperature is a liquid.	
	(c) Substance 'A' has high compressibility and can be easily liquefied. It can take up the shape of any container. Predict the state of the substance. Enlist two properties of this state of matter. OR (c) 'A small volume of water in a kettle can fill a kitchen with steam'. Explain why.	
38	The process by which new cells are made is called cell division. New cells are formed in organisms in order to grow, to replace old, dead and injured cells, and to form gametes required for reproduction. There are two main types of cell division: mitosis and meiosis. Mitosis is the kind of cell division where a cell can produce two genetically identical daughter cells from the mother cell. Mitotic cell division is also called an equational division. In this, the number of chromosomes in parents and offspring remain the same. Meiotic cell division occurs in the sexually reproducing cells. This kind of cell division forms the gametes. The male (sperm) and female (egg) gamete, both are haploid in nature (half the number of chromosomes than that of the mother cells), unite to form zygote (diploid cell) after fertilisation and give rise to offspring (young ones). When a cell divides by meiosis, it undergoes two consecutive division and forms four new cells instead of two. a) Which type of cell division is required for the growth and repair of the body and which type is involved in the formation of gametes?	4
	b) How is a diploid cell formed?	

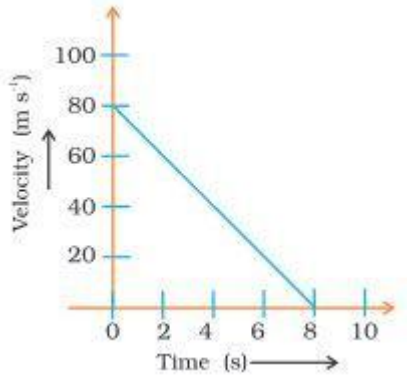
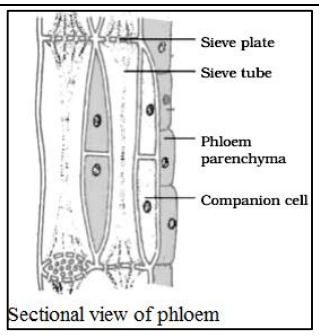
	c) What is cell division? Identify the types of cell division shown in the given figure.  **OR** c) Distinguish between mitotic and meiotic cell division.	
39	The following case is the velocity-time graph for the motion of a car. Study the given graph and answer the following questions  a) Name the physical quantity measured by the slope of the velocity - time graph. b) Which part of the graph shows accelerated motion? c) Calculate the distance travelled by the body in first 4 seconds of journey graphically. OR c) Find out the acceleration of the car in the first 4 seconds.	4

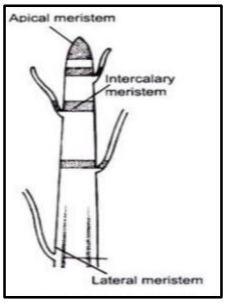
ANSWER KEY -MIDTERM SET 2-2023-24-CLASS IX-SCIENCE

1	(b) (i) and (iii)	1	1
2	(d) (i), (iii) and (iv)	1	1
3	a) First increases gradually and then becomes constant.	1	1
4	(a) High pressure, low temperature	1	1
5	(c)Evaporation, diffusion, expansion of gases	1	1
6	(c)Boiling point above room temperature and melting point below room temperature.	1	1
7	(a) Latent heat	1	1
8	d) Endoplasmic reticulum	1	1
9	b) Plant cell kept in hypertonic solution	1	1
10	b) Intercellular space and cytoplasm	1	1
11	a) Diffusion	1	1
12	c)Apical and intercalary meristems are permanent tissues.	1	1
13	(b) the body is moving with uniform velocity	1	1
14	(c) in accelerated motion	1	1
15	c)Smooth endoplasmic reticulum	1	1
16	d)Stomata, guard cells	1	1
17	(c) Assertion is true but reason is false.	1	1
18	(c)Assertion is true reason is false	1	1
19	c) A is true, but R is false.	1	1
20	(a)Both A and R are true and R is the correct explanation of A	1	1
21	a. Naphthalene undergoes sublimation easily i.e., the change of state of naphthalene from solid state to gaseous state without intervention of liquid state. b. Diffusion- Gaseous particles possess high speed and move very rapidly in all directions.	(1+1)	2
22		2	2
23	<table><tr><th>CELL WALL</th><th>PLASMA MEMBRANE</th></tr><tr><td>Cell wall is present only in plant cells.</td><td>Plasma membrane is present in both plant and animal cells.</td></tr><tr><td>Cell wall is composed of cellulose which provides structural strength to the plant cell.</td><td>Plasma membrane is made up of proteins and lipids which either allow or permit the entry of molecules in and out of the cell.</td></tr></table> **OR** During the disturbance in cellular metabolism, for example, when the	½ x 2 = 4 2	2

	cell gets damaged, lysosomes may burst and the enzymes digest their own cell. Therefore, lysosomes are also known as the 'suicide bags' of a cell.		
24	(a)Statement (b) When a bullet is fired from a gun, its velocity is very large compared to when it is thrown with a hand. When velocity is large, its linear momentum is large. Therefore, it may pierce through the person and kill him.	(1+1)	
25	Total distance travelled is 100 m + 100 m = 200 m and the total time taken is 50 s + 50 s = 100 s. $\text{Speed of boy} = \frac{\text{Distance travelled}}{\text{Time taken}} = \frac{200\text{ m}}{100\text{ s}} = 2\text{ m/s}$ The boy runs 100 m towards East and then 100 m towards West and reaches at the starting point, his home. So, the displacement will be 100 m – 100 m = 0 m. The total time taken is 50 s + 50 s = 100 s. $\text{Velocity of boy} = \frac{\text{Displacement}}{\text{Time taken}} = \frac{0\text{ m}}{100\text{ s}} = 0\text{ m/s}$ OR a. Rate of change in velocity. SI unit=m/s^2 b.  	(1+1) (1+1)	2
26	<table><tr><th>Xylem</th><th>Phloem</th></tr><tr><td>1) It transports water and minerals from roots to the apical parts of the plant.</td><td>1) It transports food material from the leaves to growing parts of the plant.</td></tr><tr><td>2) Xylem consists of tracheids, vessels, xylem fibres and xylem parenchyma.</td><td>2) Phloem consists of sieve tubes, sieve cells, companion cells, phloem fibres and phloem parenchyma.</td></tr><tr><td>3) Only xylem parenchyma is living.</td><td>3) Sieve tubes, sieve cells, companion cells and phloem parenchyma are living.</td></tr></table>	½ x 4 =2	2
27	yes  	6x1/2 =3	3

28	Factors affecting the rate of evaporation: • Surface area: The rate of evaporation increases with increase in surface area. • Temperature: The rate of evaporation increases with increase in temperature. • Humidity: The rate of evaporation decreases with increase in humidity. • Wind speed: The rate of evaporation increases with increase in wind speed. • Nature of the liquid: The volatile compounds evaporate faster than less volatile compounds (liquids). B will produce more cooling effect because it will absorb more heat from the surroundings for evaporation. OR Elements as a basic form of matter that cannot be broken down into simpler substances by chemical reaction. Metals –non-metals –metalloids—eg each	(4X1/2) +1/2+1/2 =3 (1+1+1)	3
29	a) Mitochondria have two membrane coverings. The outer membrane is porous while the <u>inner membrane is deeply folded. These folds increase surface area for ATP generating chemical reactions.</u> b) As the R.E.R (Rough Endoplasmic Reticulum) is involved in protein synthesis and the S.E.R (Smooth Endoplasmic Reticulum) is involved in lipid formation. Lipids and proteins are used to make the plasma membrane of the cell (membrane biogenesis)	1 2	3
30	a. the motion of a body moving with constant speed along a circular path b. $v^2-u^2=2as$ $s=v^2-u^2/2a$ =100-25/10 =7.5m	1 1 ½ ½	3
31	a. Inertia b. Statement **c.** Inertia of rest (explanation)	 1+1+1	3

32	 Given, initial velocity, u=80 ms^{-1}, final velocity, v=0, mass, m=50g=$50/1000$=0.05 kg and time, t=8 s. Acceleration =a=$v-u/t=-80/8$ ms^{-2}=−10 ms^{-2} As, there is only frictional force acting on the body, so force F=ma=0.05×10=0.5N	1½ 1½	3
33	a)  Sectional view of phloem b) Cells of sclerenchyma tissue have thick cell walls due to lignin. Due to the thick cell wall, intercellular spaces are absent in sclerenchyma tissue.	2 1	5
34	Any three point difference. Compound-calcium carbonate , water Mixture-sea water , air OR 2 points • Metals are generally **hard,** • Metals are good conductors of heat and electricity. • Metals have a high melting point and boiling point. • Metals are ductile.	(3+2) (3+2)	5

35	a)  b) Apical- present at the growing tip of stem and root and increases the length of stem and roots. Lateral- the girth of the stem increases. Intercalary meristem seen in some plants is located near the node. **OR** a) A- Sclerenchyma, the walls are thickened due to lignin. B- Collenchyma, The cells of this tissue are irregularly thickened at the corners. b) Because its cells are dead and compactly organised without intercellular gaps, cork works as a protective tissue. Suberin has been deposited on the walls, making them impervious to gases and water.	½ m-drawing, ½ x 3= 1 ½ Total =2 m 3 3 2	
36	a. Statement b. Consider an object of mass m moving along a straight line with an initial velocity u (say). It is uniformly accelerated to velocity u in time t by the application of a constant force F in time t. Then, initial momentum of the object = mu p 1 =mu Final momentum of the object = mv p 2 = mv ∴ Change in momentum = mv – mu = m(v – u) The rate of change in momentum = m×(v−u)t According to Newton's second law of motion, we have F ∝ m(v−u)t F = km(v−u)t F = kma …….(1) Here, a = v−u/t = the rate of change of velocity. = acceleration k = a constant of proportionality Putting m = 1kg, a = 1 ms $^{-2}$ ∴ k = 1 From equation (1), we have F = ma i. Since object A has higher mass therefore it have higher inertia ii. momentum of body A = 100*40 = 4000 kg km / hr momentum of body b = 75*60 = 4500 kg km / hr therefore body B have higher momentum	1 ½ ½ ½ ½ ½+½ ½+½	

	OR a. Mass- SI unit-kg b. It is because if they were to halt at once, their feet would suddenly come to rest but their upper body would still continue to stay in its state of motion and hence they tend to fall forward. c. u=0 s=800m t=10s $s=ut+\frac{1}{2}at^2$ $a=2s/t^2=2\times800/100$ =16m/s2 F=ma $=800\times16=12800N$	1+1 1	
37	a) Carbon dioxide ,water ,sugar	1	5
	b) Intermolecular forces between the water molecules are less. Intermolecular spaces and kinetic energy among the water molecules are more	1	
	c) A' is a gas. Properties of gases: They do not have fixed shape and fixed volume. They have large interparticle space. They have least forces of attraction between the molecules OR The liquid form of water converts into gaseous form in steam. Its particles move very rapidly in all the directions and fill the kitchen as gases completely fills the vessel.	(1+1/2+1/2) (1+1)	
38	a) Mitosis-required for the growth and repair of the body and meiosis-formation of gametes. b) The male (sperm) and female (egg) gamete, both are haploid in nature (half the number of chromosomes than that of the mother cells), unite to form zygote (diploid cell) after fertilisation and give rise to offspring (young ones). c) The process by which new cells are made is called cell division. A-Mitosis and B- Meiosis OR c) Mitosis- Two daughter are formed/ Daughter cells possess same number of chromosomes as mother cell/required for growth and repair of old, dead and worn out cells. Meiosis- Four daughter cells are formed/ daughter cells possess half the number of chromosomes as mother cell/required for formation of gametes.	1 1 1, ½ + ½ Any one point each-1+1	
39	a. acceleration	1+1+2	

	b. AB shows accelerated motion c. Area under the graph AB= ½×4×4=8m OR c. Slope of the graph=acceleration=(4-0)/(4-0)=1m/s^2		