Delhi Public School, Howrah

PERIODIC ASSESSMENT II (2024-2025)

CLASS-IX

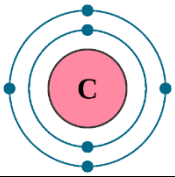
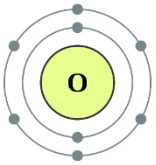
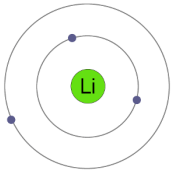
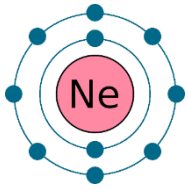
Care must be taken not to write anything on the question paper. All the questions must be attempted in the correct sequence.

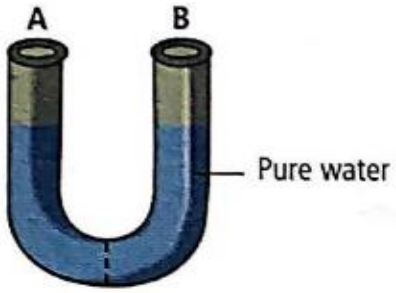
SUBJECT:- SCIENCE (CODE NO. 086)

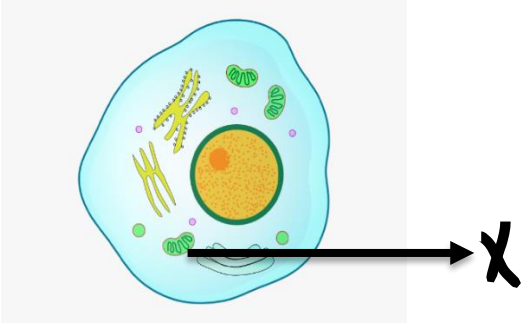
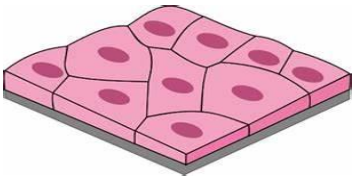
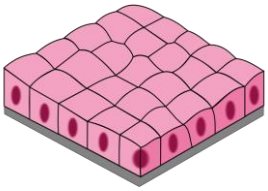
Time:-3 Hours **F.M.-80**

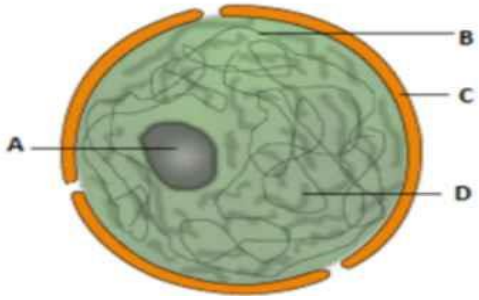
General Instructions:

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 01 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.**

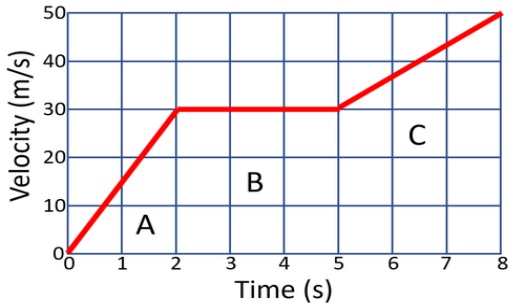
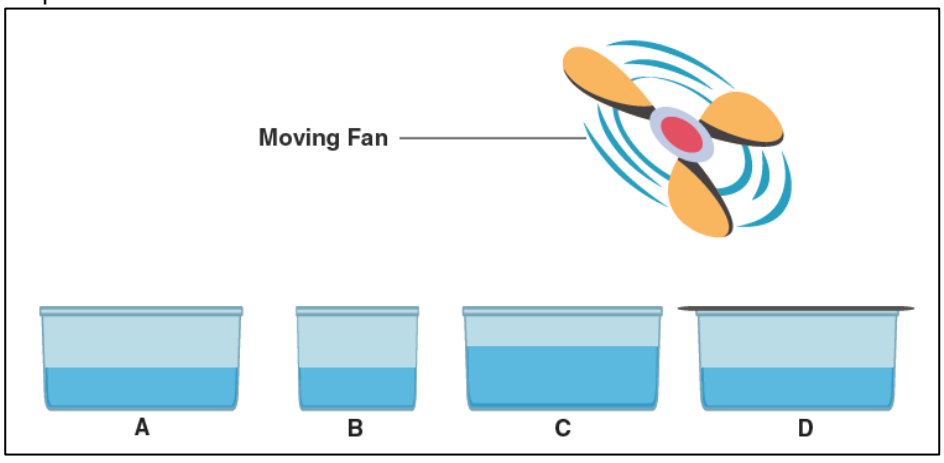
	SECTION A **Select and write one most appropriate option out of the four options given for each of the questions 1 – 20**	
1.	Which one of the following best illustrates law of conservation of mass? A. $CaCO_3 \xrightarrow{Heat} CaO + CO_2$ 100g 56g 44g B. $N_2 + H_2 \rightarrow NH_3$ 28g 2g 17g C. $C + O_2 \xrightarrow{Heat} CO_2$ 12g 32g 54g D. $Ca + H_2O \rightarrow Ca(OH)_2 + H_2$ 40g 18g 74g 2g (a) Both A and B (b) Only A (c) Both B and D (d) Both A and C	1
2.	Study the diagrams given below and state which of the molecules will show bivalency. a  b  c  d 	1
3.	If the formula of ammonium sulphate is $(NH_4)_2SO_4$ then what would be the correct formula of aluminium sulphate? (a) Al_2SO_4 (b) $Al(SO_4)_2$ (c) $Al_3(SO_4)_2$ (d) $Al_2(SO_4)_3$	1

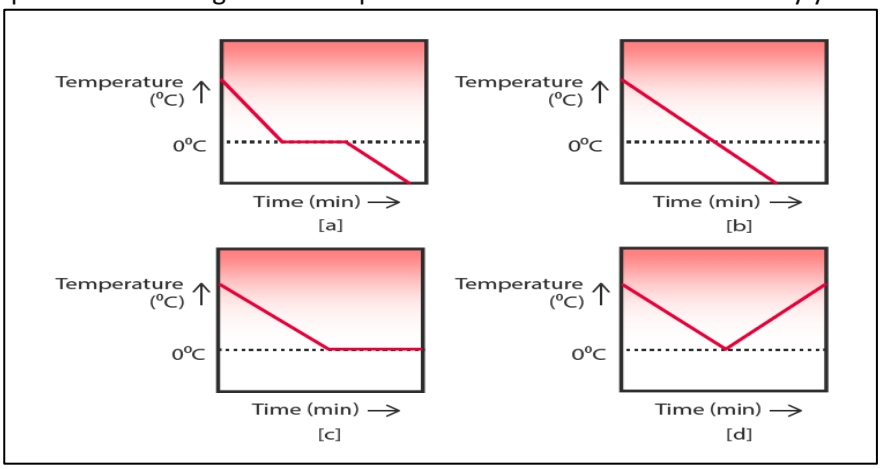
4.	Few substances are arranged in decreasing order of 'force of attraction' between their particles. Which one of the following represent a correct sequence? (a) Air, rice, alcohol (b) Juice, iron, air (c) Sugar, air, juice (d) Iron, juice, air	1
5.	During summer, water in an earthen pot cools due to the phenomenon known as- (a) diffusion (b) transpiration (c) osmosis (d) evaporation	1
6.	On converting 25°C, 38°C and 66°C to kelvin scale, the correct sequence of temperature will be (a) 298 K, 311 K and 339 K (b) 298 K, 300 K and 338 K (c) 273 K, 278 K and 543 K (d) 298 K, 310 K and 338 K	1
7.	Which of the following are chemical changes? (i) Decaying of wood (ii) Burning of wood (iii) Sawing of wood (iv) Hammering of a nail into a piece of wood (a) (i) and (ii) (b) (ii) and (iii) (c) (iii) and (iv) (d) (i) and (iv)	1
8.	Refer to the given figure showing a U-shaped tube with two hands A and B separated by a semi-permeable membrane. Choose the option with the correct statement.  i. Adding solute to the right side will cause water to move to the right side of the tube. ii. Applying pressure on the left side will cause water to move to the right side of the tube. iii. Applying pressure on the right side will cause water to move to the left side of the tube. (a) i and ii (b) i only (c) i, ii and iii (d)iii only	1
9.	Ronit often used to go with his father to collect milk from the milk man. One day, the milk man told his father that he was going to purchase a Jersey breed of cattle as he was not able to fulfil the demand of his customers to supply good quality milk. Ronit asked his father about the Jersey. Among the following statements which might not be the answer given by his father? (a) It is a high milk yielding variety of buffalo (b) It gives good quality of milk (c) It is a very popular exotic breed (d) It is a breed with massive body	1

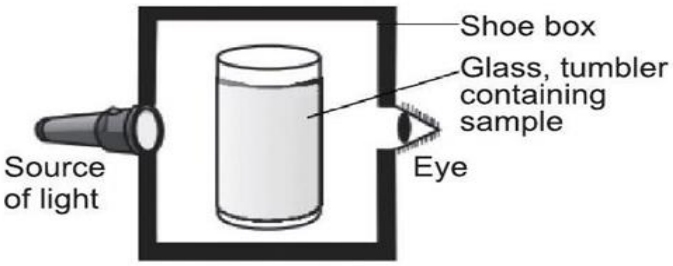
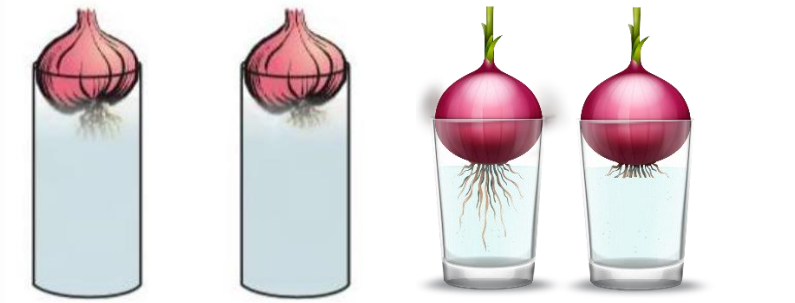
10.	Refer to the given picture of an animal cell. Select the incorrect statement regarding part 'X' that is marked in the picture shown below.  (i) It determines the energy production in cell. (ii) It is a non- membranous cellular organelle. (iii) It is not well defined in prokaryotic cell. (iv) It helps in transmission of hereditary traits from parents to offspring. (a) i, ii and iv (b) ii, iii (c) i, iii and iv (d) ii, iv	1
11.	Unicellular algae X and Y of the same species were taken and chloroplasts were removed from cell X. After sometimes, they both were kept in bright sunlight for few hours and then iodine test was performed on them. What will be the results? (a) Both X and Y will turn blue-black. (b) Cell X will turn blue-black. (c) Cell Y will turn blue-black. (d) Both X and Y will remain as they originally were.	1
12.	The figures given below show two types of epithelial tissue (P and Q). Select the correct option regarding them.  P  Q (a)P and Q are simple squamous epithelium and stratified squamous epithelium respectively. (b)The cells in epithelium Q is arranged in many layers to avoid wear and tear. (c)Epithelium P lines blood vessels and lung alveoli where exchange of substances occurs. (d)Epithelium Q lines stomach and small intestine where it provides mechanical support.	1
13.	A stone is thrown vertically upward with a velocity of 5 m/s. The velocity with which it will strike the ground is (a) 5 m/s (b) 10 m/s (c) 15 m/s (d) 20 m/s	1
14.	A block X of mass "m" strikes another block Y of mass "2m". Both the blocks collide and at point of collision the block X exerts the force of 10 N to block Y. What will be the magnitude and direction of the force exerted by block Y? (a) 10 N, in the same direction of force of block X (b) 20 N, in the same direction of force of block X (c) 10 N, opposite to the direction of force of block X (d) 20 N, opposite to the direction of force of block X	1

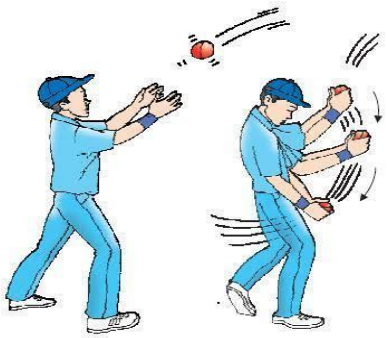
15.	The nucleus controls all the activities of the cell and acts as a site of DNA material and protein synthesis. It is composed of some components which all together give the nucleus its functionality. A figure of nucleus is shown with some of its components labeled as A, B, C and D. Identify A, B, C and D.  (a) A – Nucleons; B – Chromatin; C – Nuclear membrane; D – Nucleoplasm (b) A – Nucleus; B – Chromatin; C – Nuclear membrane; D – Nucleoplasm (c) A – Nucleolus; B – Chromatin; C – Nuclear membrane; D – Nucleoplasm (d) A – Nucleolus; B – Chromatin; C – Nuclear membrane; D – Nuclear wall	1
16.	Manure is organic matter used to enrich the soil with nutrients and also improves the physical structure of soil. Following are given some statements regarding the composition and effects of using manure. Identify the correct sentences about manure. i. Manure contains large quantities of organic matter and small quantities of nutrients ii. It increases the water holding capacity of sandy soil iii. It helps in draining out the excess of water from clayey soil iv. Its excessive use pollutes the environment because it is made of animal excretory waste (a) (i) and (iii) (b) (i) and (iv) (c) (ii) and (iii) (d) (iii) and (iv)	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(A):** The molecules of the gases like hydrogen, oxygen and nitrogen contain two atoms. **Reason(R):** Hydrogen, nitrogen and oxygen is divalent in nature.	1
18.	**Assertion(A):** Materials are exchanged between epithelial and connective tissues by diffusion. **Reason(R):** Blood vessels are usually absent in epithelial tissue.	1
19.	**Assertion(A):** The gravitational acceleration at the poles is greater than the gravitational acceleration at the equator. **Reason**(R)**:** The gravitational acceleration at a place on Earth is inversely proportional to the distance from the centre of the Earth.	1
20.	**Assertion(A):** Smooth muscle fibres do not appear to be striated. **Reason(R):**There is a regular alternate arrangement of thick and thin filaments in smooth muscle fibre.	1
	SECTION B **Q. no. 21 to 26 are very short answer questions.**	
21.	Calculate the mass percentage of carbon and oxygen in sodium bicarbonate ($NaHCO_3$). (Atomic masses of the elements Na = 23u, H = 1u, C = 12u, O = 16u).	2
22.	Government was setting up a school in the village. In the panchayat, Vinod who had just complete his class X suggested that the children should be taught about different agricultural practices and use of modern technology in it. Sarpanch liked the idea and arranged for the same.	2

	(a) Children were taught that wheat cannot be grown in Kharif season. Why? (b) Mention the desirable agronomic characters that must have been taught to the children about growing cereals in an agricultural field.	
23.	(a) Cartilage is pliable whereas bone is rigid. Give reason. (b) Discuss how cardiac muscle tissues have the characteristic of both smooth muscle and striated muscle. **OR** (a) What will happen if epidermis of leaves are covered with a layer of Vaseline? (b) How are the sieve tube elements living when they are devoid of a nucleus?	2
24.	Plot velocity-time graph for a moving car whose initial velocity is 5 m/s and is moving with a retardation of $1 m/s^2$. Find the time at which the car will come to the rest and indicate it in the graph.	1+1
25.	Two bodies of masses 'm' and '2m' respectively, fall down through the same height in an evacuated chamber. What will be the ratio of their velocities when they reach the ground? Also find the ratio of time taken by them to reach the ground. **OR** Weight of an object on the surface of earth is 196 N. If acceleration due to gravity on the surface of Moon is 1/6 times that on the surface of Earth, find mass and weight of the object on the surface of Moon. Assume acceleration due to gravity on the surface of earth is $9.8 m/s^2$.	2
26.	The volume of 50 g of a substance is 20 cm^3. If the density of water is 1 g cm^{-3}, will the substance float or sink? Justify your answer with proper reason.	2
	SECTION C **Q.no. 27 to 33 are short answer questions.**	
27.	(a) 12g of carbon always reacts with 16g of oxygen to produce carbon monoxide. If we increase the amount of carbon but keep the amount of oxygen fixed at 16g, we observe no changes. What does it indicate? Explain. (b) What will happen if we keep amount of carbon fixed at 12g but double the amount of oxygen in the reaction?	2+1
28.	(a) 4% NaOH solution contains 15g of NaOH by mass. Calculate the mass of the solvent. (Atomic masses of the elements Na=23u, H=1u, O=16u). (b) What would be a suitable solvent in this case? **OR** What will you observe when (a) a saturated solution of potassium chloride prepared at 60°C is allowed to cool to room temperature? (b) an aqueous sugar solution is heated to dryness? (c) a mixture of iron filings and sulphur powder is heated strongly?	3
29.	A student develops a rash and itching on their skin, leading to discomfort and irritation. The school nurse suggests that this might be related to issues with tissues present in the skin. Answer the following questions:  (a) What type of tissue makes up the skin, and what are its functions? (b) Which property of the tissue present in the skin allows the exchange of materials between the body and the external environment? (c) Discuss how connective tissue supports the skin and helps in its function.	3

30.	Farmer 'X' planted Soyabean + Maize + Cowpeas in the same field simultaneously in a set row pattern. Farmer 'Y' planted cereal crop in one season and leguminous plants in next season on the same piece of land in preplanned succession. (a) Name the cropping pattern used by farmers 'X' and 'Y'. (b) State two advantages each of different cropping patterns followed by farmers 'X' and 'Y' respectively. (c) 'Removal of weeds from cultivated fields during the early stages of crop growth is essential for a good harvest' Give reason.	3
31.	(a) For a moving body, magnitude of average velocity is equal to its average speed. State the condition for which it holds true. (b) Same amount of force is applied on two bodies A and B. Acceleration produced in them are 2.5 m/s^2 and 4 m/s^2 respectively. Which one of them will have greater amount of inertia? Why?	3
32.	Velocity-time graph of a body is depicted below. (a) Does the body possess uniform motion anytime during the motion? (b) Find the maximum acceleration of the body. (c) Calculate the displacement of the object during the time interval 5 second to 8 second. 	2+1
33.	(a) An object weighs 100 N on the surface of Earth at equator. Will you find the same weight for the same object at poles? Justify it. (b) A stone is released from the top of a tower of height 19.6 m. Calculate its final velocity just before touching the ground.	2+1
	SECTION-D **Q.no. 34 to 36 are long answer questions.**	
34.	(a) Observe the following figure and suggest in which of the vessels A, B, C or D the rate of evaporation will be the highest? Explain.  (b) Explain why temperature remain constant during the change of state of water into vapour by the process of boiling? (c) The arrangement of particles is less ordered in the liquid state. However, there is no order in the gaseous state. Justify. **OR**	2+2 +1

	(a) A glass tumbler containing hot water is kept in the freezer compartment of a refrigerator (temperature < 0°C). If you could measure the temperature of the content of the tumbler, which of the following graphs would correctly represent the change in its temperature as a function of time. Justify your answer.  (b) What will happen to the melting point of ice if some common salt is added to it? (c) Name the process in which solid state of matter is directly converted to vapour without going through the liquid state.	
35.	(a)Draw a plant cell and label the parts which 1.determines the function and development of the cell 2.packages materials coming from the endoplasmic reticulum 3.provides resistance to microbes to withstand hypotonic external media without bursting 4.is site for many biochemical reactions necessary to sustain life. (b)How is endoplasmic reticulum important for membrane biogenesis? (c) A student performed the following experiment: He took a clean glass slide and put few drops of water on it. Then placed a complete Rheo leaf on water droplets and examined the cells of leaf under the high power of compound microscope. Then he again put a few drops of concentrated salt/sugar solution on the mounted Rheo leaf on the glass slide, waited for few minutes and again observed the leaf under the high power of microscope. What will be his observation after few minutes? **OR** (a)Draw an animal cell and label the parts which 1.is known as scavenger of cells 2.is the site of aerobic respiration 3. provides detoxification 4.provide support by acting like skeletal framework (b)An onion cell has 16 chromosomes. How many chromosomes will be present in the gamete of the plant? Why is the chromosome number different? (c) Pickles are preserved in high salt concentration. How does this prevent microbial growth on pickles.?	5
36.	(a) What happens to the force of interaction between two objects if (i) the mass of one object is doubled? (ii) the distance between those objects is tripled? Justify with proper reason. (b) A student thought that two bricks tied together would fall faster than a single one under the action of gravity. Do you agree with this hypothesis or not? Support with proper reason. (c) The weight of a body on the surface of earth is 60 N. Find its mass when measured at the centre of earth if acceleration due to gravity on the surface of Earth is 10 m/s^2. **OR** (a) When an object is immersed in a fluid, two forces act on the object in vertically opposite directions. Name them and also write the factors on which the magnitude of these forces depends. (b) What is the relation between these forces in the above case when a body floats?	2+2 +1 2+1 +2

	(c) Density of a body is 90% the density of liquid. When the body floats in the liquid, find the percentage volume of it inside the liquid.	
	SECTION - E ***Q.no. 37 to 39 are case - based/data -based questions with 3 short sub - parts. Internal choice is provided in one of these sub-parts.***	
37.	A group of students took an old shoe box and covered it with a black paper from all sides. They fixed a source of light (a torch) at one end of the box by making a hole in it and made another hole on the other side to view the light. They placed a milk sample contained in a tumbler in the box as shown in the figure below. They were amazed to see that milk taken in the tumbler was illuminated. They tried the same activity by taking a table salt solution but found that light simply passed through it.  (a) Explain why the milk sample was illuminated? Name the phenomenon involved. (b) Why same results were not observed with a salt solution? (c) Suggest one more solution that would show the same effect as shown by the milk solution. **OR** (c) Give one example of above phenomenon observed in nature.	4
38.	Rajesh and Ayush both are bright students studying in Class IX. An experiment on demonstrating a vital process was given to the class. In this experiment, two jars, A and B, having onion bulbs with root tips dipping in water were given as shown in the given figure. The root tips were allowed to grow for a few days. However, after few days Rajesh cut the root tip about 1cm of the onion bulb in jar B. Rajesh then disturbed the experimental set-up of Ayush and replaced water with acetic acid in jar B.  (a) i. Is there a difference in length of roots between the root-trimmed onion (in jar B) and the un-trimmed one (in jar A)? Give reasons. ii. Do the roots continue growing even after we have removed their tip? Give reason. (b) What happens when water is replaced with acetic acid in jar B? (c) Write down two differences between osmosis and diffusion **OR** (c) State the tissue found at the base of the internodes in grass.	4

39.	Have you noticed that while catching a fast-moving cricket ball, a fielder in the ground gradually pulls his hands backwards with the moving ball? By doing so, the fielder increases the time during which the high velocity of the ball decreases to zero. Thus, the acceleration of the ball is decreased and therefore the impact of catching the fast-moving ball is also reduced. If the ball is stopped suddenly then its high velocity decreases to zero in a very short interval of time. Thus, the rate of change of momentum of the ball will be large. Therefore, a large force would have to applied for holding the catch that may hurt the palm of the fielder.  Answer the following questions: (a) State the law given by Newton that correctly explains the common experience given above. (b) An object of mass 2 kg is sliding with a constant velocity of 4 m/s on a frictionless horizontal table. How much force is required to keep the object moving with the same velocity? (c) In a high jump athletic event, why are the athletes made to fall either on a cushioned bed or on a sand bed? What would happen if they fall on concrete floor? **OR** (c) A water tank filled up to 2/3 of its height is moving with a uniform speed. On sudden application of the brake, what would happen to the water in the tank? Explain with proper reason.	4