ANANDALAYA
PERIODIC TEST - 2
Class: IX

|	
Subject: Science	MM : 80
Date : 21-09-2024	Time: 3 hours

General Instructions:
1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. 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.
5. 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.
6. 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.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION A

1. Which of the following can be classified as a mixture? (1)
   (A) a clear white salt solution   (B) a rusted iron nail
   (C) a piece of paper cut into different shapes (D) a bowl of water with floating ice cubes

2. Iron rod turns red on heating. The change is a _____ change. (1)
   (A) physical   (B) permanent   (C) irreversible   (D) chemical

3. Which of the process(es) - (i) Condensation, (ii) Vaporisation, (iii) Freezing and (iv) Melting release(s) heat? (1)
   (A) Only (i)   (B) Only (iv)   (C) (i) and (iii)   (D) (ii) and (iv)

4. The diagram shows the heat energy, in kilojoules (kJ), needed for each step in changing a 10 g ice cube at $-5\ °C$ to steam at $100\ °C$. (1)
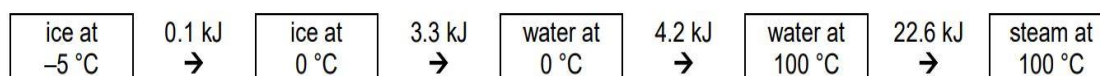
   Based on the data in the diagram, it takes more energy to _____.
   (A) melt 10 g of ice at $0°C$ than to boil 10 g of water at $100\ °C$.
   (B) heat 10 g of water by $1\ °C$ than to melt 10 g of ice at $0\ °C$.
   (C) heat 10 g of steam by $1\ °C$ than to heat 10 g of water by $1\ °C$.
   (D) heat 10 g of water by $1\ °C$ than to heat 10 g of ice by $1\ °C$.

5. Kinetic energy of particles of water in three vessels A, B, and C, are E_A, E_B, and E_C respectively and $E_A > E_B > E_C$. The temperatures T_A, T_B, T_C of water in the three vessels in increasing order are _____. (1)
   (A) $T_B > T_A > T_C$ (B) $T_A > T_B > T_C$ (C) $T_C > T_B > T_A$ (D) $T_A > T_C > T_B$

6. The function of the nucleus in a cell is _____. (1)
   (A) synthesis of proteins
   (B) cellular respiration
   (C) control of cell activities and storage of genetic material
   (D) breakdown of cellular waste

7. Osmosis describes the movement of solvent molecules across a semipermeable membrane from a less concentrated solution to a more concentrated one. Which option does not belong to this process? (1)
   (A) The movement of water across the membrane depends on the dissolved substances.
   (B) Membranes are composed of organic molecules like proteins and lipids.
   (C) Solutes soluble in organic solvents can permeate the membrane easily.
   (D) Plasma membrane of a plant cell contains chitin sugar.

8. Which organelle is involved in the breakdown of glucose to produce energy in the form of ATP? (1)
   (A) Mitochondria   (B) Cytoskeleton   (C) Nucleus   (D) Golgi apparatus

9. Name the structure that helps in the movement of chromosomes during cell division. (1)
   (A) Centrosome   (B) Golgi apparatus   (C) Nucleolus   (D) Ribosomes

10. Given a figure of the nucleus with parts labelled as T, X, Y, and Z. Identify the components correctly. (1)
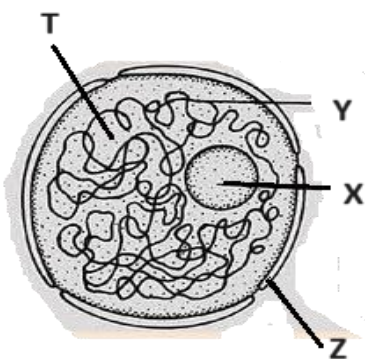
   (A) T – Nucleolus; X –Chromatin; Y – Nuclear membrane; Z – Nucleoplasm
   (B) X –Nucleolus; T – Chromatin; Z – Nuclear membrane; Y – Nucleoplasm
   (C) X – Nucleolus; Y – Chromatin; Z – Nuclear membrane; T – Nucleoplasm
   (D) Z – Nucleolus; T – Chromatin; Y – Nuclear membrane; X – Nucleoplasm

11. Identify the incorrect statement on plant tissues from the given options: (1)
    (A) Parenchymatous tissues have intercellular spaces.
    (B) Collenchymatous tissues are irregularly thickened at corners.
    (C) Apical and intercalary meristems are permanent tissues.
    (D) Meristematic tissues, in their early stage, lack vacuoles.

12. Tissue is a group of similar cells that performs a particular function in an organism. The presence of tissues in a multicellular organism ensures: (1)
    (A) Faster development   (B) Division of labour
    (C) Higher reproductive potential   (D) Body strength

13. A particle is moving in a circular path of radius r. The distance and displacement after one and half a circle would be _____. (1)
    (A) πr and r (B) πr and $2r$ (C) $3\pi r$ and r (D) $3\pi r$ and $2r$

14. Identify the incorrect option. (1)
    According to Newton's third law of motion, action and reaction _____.
    (A) act on different bodies   (B) equal and opposite to each other
    (C) have same direction   (D) never cancel out each other

15. If earth is taken as a sphere of mass M and radius R, the value of acceleration due to gravity (g) on the surface of earth is given by _____. (1)

    (A) $G = \dfrac{gM}{R^2}$ (B) $g = \dfrac{GM}{R^2}$ (C) $g = \dfrac{GM}{R^3}$ (D) $g = \dfrac{G}{MR^2}$

16. You are on a frictionless horizontal plane. How can you get off if no horizontal force is exerted by pushing against the surface? (1)
    (A) By jumping   (B) By splitting or sneezing
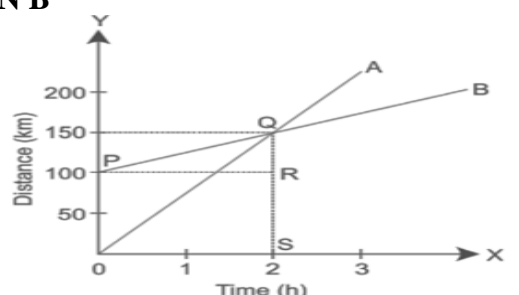   (C) By rolling your body on the surface (D) By running on the plane

In the following questions (Q. No. 17 to 20), a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choices.
(A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, but 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. (A): Object falling freely under gravity is an example of a uniformly accelerated motion. (1)
    (R): During free fall, the velocity of the object increases uniformly.

18. (A): Sponge is compressible, but considered as a solid (1)
    (R): Solids are those who have fixed shape and fixed volume.

19. (A): Plasma membrane is selectively permeable. (1)
    (R): Plasma membrane allows some molecules to pass through it more easily than others.

20. (A): Vascular or conductive tissue is a distinctive feature of complex plants. (1)
    (R): Vascular tissue has made survival of complex plants possible in terrestrial environments.

SECTION B

21. The given figure shows the distance-time graph of two trains A and B. Study the graph and answer the following questions: (2)
    (a) Which train travels the slowest and what will be its speed?
    (b) When and where A will catch B?

22. A force of 5 N gives a mass m_1, an acceleration of 10 m s^{-2} and a mass m_2, an acceleration of 20 m s^{-2}. What acceleration would it give if both the masses were tied together?

OR

How much momentum will a dumbbell of mass 10 kg transfer to the floor if it falls from a height (2) of 0.8 m? Take its downward acceleration to be 10 ms^{-2}.

23. Mention the solute and the solvent present in aerated drinks. (2)

24. Solids are generally denser than liquids and gases. Explain with appropriate examples. (2)

25. Identify the tissues present in the following: (2)
     (a) leaf stalk   (b) lotus stem   (c) coconut husk   (d) seed coat

26. You must have observed that a fruit when unripe is green but it becomes colourful when ripe. (2) According to you what is the reason behind this colour change? Explain.

SECTION C

27. (a) How can a saturated solution be made unsaturated? (3)
    (b) With the help of following chemicals/apparatus, find the difference between a mixture and a compound - Sulphur powder, a magnet, carbon disulphide and iron fillings, China dish and Bunsen burner

28. (a) With the help of an example explain how diffusion of gases in water is essential. (3)
    (b) How is high compressibility property of gases being useful to us?

OR

(a) On a hot sunny day, why do we feel pleasant sitting under a tree?
(b) Define: Diffusion

29. (a) How is speed different from velocity? (3)
    (b) A car moving along a straight highway with a speed of 72km/h is brought to a stop within a distance of 100m. What is the retardation of the car and how long does it take for the car to stop?

30. (a) Draw velocity-time graph for a body in (i) uniform motion and (ii) non uniform motion. (3)
    (b) What do the slope and area under velocity-time graph represent?

31. Complete the given table by replacing P, Q, R, S, T and W with appropriate words: (3)

Cell Organelles	Present in Prokaryotic cell / Eukaryotic cell / both	Present in Plant cell / Animal cell / both	Function
Endoplasmic Reticulum	P	Q	Synthesis of protein and lipids
Vacuole	R	Both	S
Chloroplast	Eukaryotic cell	T	W

32. (a) Draw the diagram to show the distribution of stomata in the leaf epidermis. (3)
    (b) Write the function of stomata in the leaf epidermis.

33. (a) State the universal law of gravitation. Give its mathematical form. (3)
    (b) Why is the law of gravitation called universal law of gravitation?
    (c) Gravitational force between two objects is F. How will the force change when distance between them is reduced half?

SECTION D

34. (a) Benzoic acid is used as a food preservative. The graph shows the heating curve for benzoic acid. Study the graph and answer the following questions. (5)
    (i) At what time does the benzoic acid begin to melt?
    (ii) Predict the melting point of Benzoic acid.
    (iii) What is the physical state of benzoic acid during the time interval of 35-45 min?
   (b) What is matter? Write any two properties of liquids?
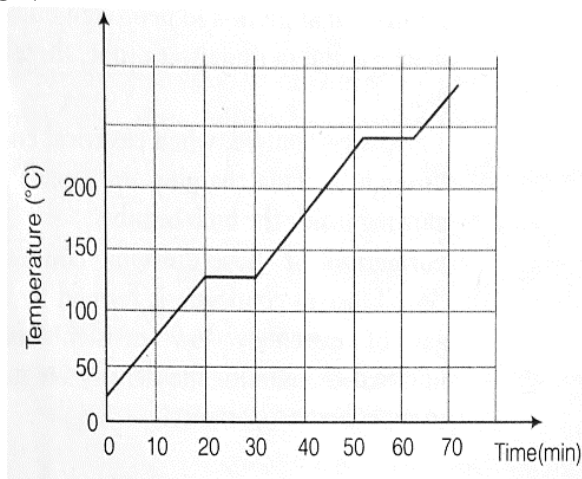
OR

(a) Three glasses are filled with an equal amount of water. These are labelled as A, B and C. Glass A is kept under the fan, glass B is at room temperature, and glass C is in sunlight for 10 -15 min.
    (i) In which glass you will find the level of water decreasing the most? Why?
    (ii) What are the factors responsible for evaporation?
    (iii) Give one point of difference between evaporation and boiling.
(b) What type of clothes should we wear in summer and why?

35. (a) State and explain Newton's second law of motion. (5)
    (b) Explain why:
        (i) A cricket player lowers his hand while catching a ball.
        (ii) In a high jump athletic event, the athletes are made to fall on a cushioned bed.
        (ii) A person falling from a height receives more injuries.

OR

(a) State the law of inertia.
(b) What is the measure of inertia?
(c) Discuss its types by giving an appropriate example in each case.

36. (a) The figure of phloem tissue is given below with the parts labelled as W, X, Y and Z. (5)
    Identify the main components of phloem tissue from the figure.
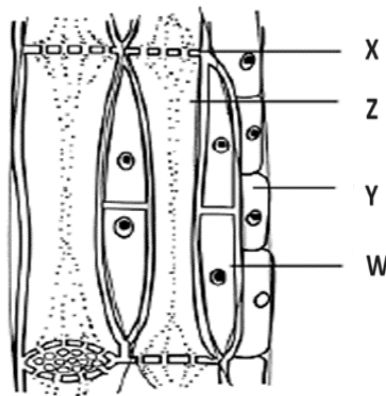
    (b) Write any three differences between phloem and xylem based on their components and
    functions.

OR

(a) Identify the figures X and Y of the simple permanent tissues.
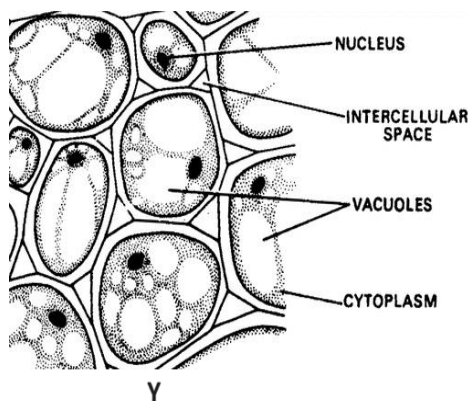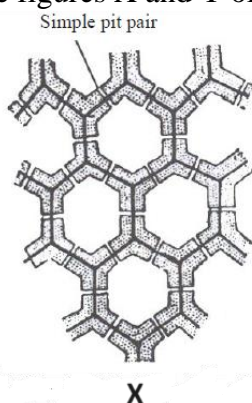
    (b) Write any of the three differences between X and Y based on their structure and functions.
    (c) What happens to the cells formed by meristematic tissue?

SECTION E

Questions 37 to 39 are Source-based/ Case study based questions of 4 marks with sub-parts.

37. Weight of a body is the force with which the body is attracted towards the centre of earth. It
    is given by $W = mg$, where g is acceleration due to gravity. At the centre of earth, $g = 0$. As
    we move above or below the surface of earth, the value of g goes on decreasing.

    (i)   A body of given mass weighs _____. (1)

          (A) maximum at the centre of earth
          (B) maximum at the surface of earth
          (C) more at a height above the surface of earth
          (D) more at a depth below the surface of earth

    (ii) A body weighs 60 kg on the surface of earth. Its mass and weight on the surface of moon (1)
          are _____.

          (A) 60 kg, 10 kg.wt   (B) 60 kg, 60 kg.wt
          (C) 10 kg, 60 kg.wt   (D) 10 kg, 10 kg.wt

    (iii) Suresh buys few grams of gold at the poles as per the instruction of one of his friends. He (2)
          hands over the same when he meets him at the equator. Will the friend agree with the weight
          of gold bought? If not, why?

OR

    (iii) The earth and the moon are attracted to each other by gravitational force. Does the earth attract
          the moon with a force that is greater or smaller or the same as the force with which the moon
          attracts the earth? Why?

38. The Role of Colloidal Systems in Food Industry:
Background: Colloidal systems are widely used in food products, particularly in creating stable emulsions, foams, and gels. Emulsions like mayonnaise and salad dressings are prime examples of colloids that rely on the stability provided by the dispersed phase and the continuous medium.
Problem: Maintaining the stability of colloidal systems in food products can be challenging due to the tendency of the dispersed phase to aggregate or separate, leading to undesirable textures and appearances.
Approach: Emulsifiers, such as lecithin in egg yolk, are used to stabilize emulsions by reducing the surface tension between the dispersed droplets and the continuous phase. For example, in mayonnaise, oil droplets are dispersed in water, stabilized by lecithin, which prevents the oil from separating.
Outcome: The use of emulsifiers and stabilizers in colloidal systems ensures that food products maintain their desired texture, consistency, and shelf-life. This has revolutionized the food industry, allowing for a wide variety of products that would otherwise be impossible to produce.
Answer the following questions.
(i) Match the column I (Type of colloids) with column II (Examples). (1)

Types of colloids	Examples
P. Gel	1. Curd
Q. Aerosol	2. Cheese
R. Emulsion	3. Smoke
S. Solid sol	4. Gemstone
T. Foam	5. shaving cream
	6. Face cream

   (A) P-6, Q-3, R-5, S-4, T-2   (B) P-1, Q-3, R-5, S-2, T-3
   (C) P-5, Q-3, R-6, S-4, T-2   (D)P-2, Q-3, R-6, S-4, T-5.
(ii) Is Tyndall effect an optical property? Justify your answer. (1)

(iii) Write any two properties of colloidal solution. (2)

OR

(iii) (a) Name the method which is used to separate the components of colloidal solution?
      (b) What is the state of dispersed phase and dispersing medium in emulsion?

39. The plant cells have another rigid outer covering called the cell wall in addition to the plasma membrane. The cell wall lies outside the plasma membrane. The plant cell wall is mainly composed of cellulose. Cellulose is a complex substance and provides structural strength to plants. When a living plant cell loses water through osmosis there is shrinkage or contraction of the cell contents away from the cell wall. This phenomenon is known as plasmolysis.

(i) Cellulose is a _____. (1)
   (A) polysaccharide   (B) monosaccharide   (C) disaccharide   (D) oligosaccharide

(ii) The plant cell loses water when the cell sap is _____ to the surrounding medium. (1)
   (A) hypertonic   (B) isotonic
   (C) hygertonic   (D) hypotonic

(iii) How is the process of diffusion and osmosis different from plasmolysis? (2)

OR

(iii) Plasmolysis is a reversible process. Explain.