

BRAINYCHALKS
Institute for CBSE | JEE | NEET | OLYMPIAD
MONTHLY ASSESSMENT - I

Marks – 40

SUBJECT – SCIENCE

**Time – 1 hr
30 min**

Chapters: Describing Motion Around Us | Exploring Mixtures and Their Separation | Cell: Prokaryotic, Eukaryotic and Multicellular Organisms

General Instructions

- (i) This question paper contains 20 questions. All questions are compulsory.
- (ii) This question paper comprises four Sections A, B, C and D.
- (iii) Section A Questions no. 1 to 10 are MCQs of 1 mark each.
- (iv) Section B Questions no. 11 to 13 are very short answer type questions, carrying 2 marks each. Answer to each question should not exceed 40 words.
- (v) Section C Questions no. 14 to 17 are short answer type questions, carrying 3 marks each. Answer to each question should not exceed 60 words.
- (vi) Section D Questions no. 18 to 20 are case-based questions, carrying 4 marks each.
- (vii) There is no overall choice in the question paper. However, an internal choice has been provided in a few questions. Only one of the choices in such questions has to be attempted.

SECTION A

(Multiple Choice Questions) ($10 \times 1 = 10$)

1. A student walks 200 m north and then 200 m south to return to the starting point. What is the displacement?
 - (a) 0 m
 - (b) 200 m
 - (c) 400 m
 - (d) 100 m
2. Which of the following mixtures shows the Tyndall effect?
 - (a) Salt solution
 - (b) Acetone and water
 - (c) Starch and water
 - (d) Copper sulphate solution
3. The plasma membrane is called selectively permeable because it:
 - (a) allows all substances to pass freely
 - (b) allows only certain substances to pass through it
 - (c) does not allow water to pass
 - (d) is made only of proteins
4. The slope of a position–time graph represents:
 - (a) acceleration
 - (b) displacement
 - (c) speed/velocity
 - (d) force
5. Which method is most suitable for separating oil and water?
 - (a) Filtration
 - (b) Sublimation
 - (c) Separating funnel
 - (d) Chromatography
6. Which organelle is known as the powerhouse of the cell?

- (a) Golgi apparatus
- (b) Mitochondrion
- (c) Lysosome
- (d) Ribosome

7. Assertion (A): An object moving with constant speed in a circular path is accelerated.

Reason (R): Its direction of velocity changes continuously.

Choose the correct option.

- (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.

8. A solution is prepared by dissolving 20 g of sugar in 80 g of water. What is the mass by mass percentage of sugar?

- (a) 16.67%
- (b) 20%
- (c) 25%
- (d) 80%

9. Which one correctly distinguishes a prokaryotic cell from a eukaryotic cell?

- (a) Prokaryotic cells have a true nucleus.
- (b) Eukaryotic cells lack membrane-bound organelles.
- (c) Prokaryotic cells lack a membrane-bound nucleus.
- (d) Both types always contain membrane-bound organelles.

10. A car starts from rest and accelerates uniformly at 2 m s^{-2} for 5 s. Its final velocity is:

- (a) 5 m s^{-1}
- (b) 7 m s^{-1}
- (c) 10 m s^{-1}
- (d) 12 m s^{-1}

SECTION B

(3 × 2 = 6)

11. Differentiate between distance and displacement. Give one situation in which the displacement of an object is zero although the distance travelled is not zero.

12. Differentiate between a solution, a suspension and a colloid on the basis of any two properties.

13. Why is the cell membrane called selectively permeable? What happens to a cell placed in a hypertonic solution?

SECTION C

(4 × 3 = 12)

14. A car starts from rest and moves with a uniform acceleration of 2 m s^{-2} for 5 s. Calculate (i) its final velocity and (ii) the distance travelled in this time.

15. Three students prepare sugar solutions as follows: A dissolves 20 g sugar in 80 g water; B dissolves 20 g sugar in 100 g water. Calculate the mass percentage of sugar in each solution and identify the more concentrated solution.

OR

Explain why crystallisation is preferred over simple evaporation for obtaining a pure solid from a solution. Mention the basic steps involved.

16. Differentiate between prokaryotic and eukaryotic cells on the basis of nucleus, membrane-bound organelles and cell division.

OR

Explain osmosis using the terms hypotonic, hypertonic and isotonic solution. Give one example of its application.

17. Explain how a velocity–time graph can be used to determine (i) acceleration and (ii) displacement of a moving object. State the physical meaning of the slope and area under the graph.

SECTION D

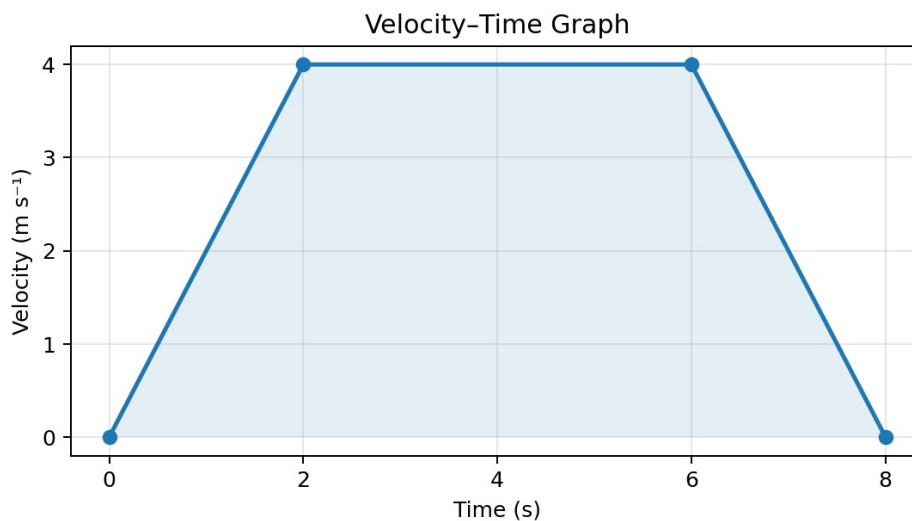
(3 × 4 = 12)

Objective / Competency-Based Case Questions

18. A science laboratory receives three mixtures: salt + water, chalk powder + water and milk + water. The teacher asks students to pass a beam of light through each mixture, leave them undisturbed and then test them using filtration. Answer the following questions:

- (i) Which mixture is a true solution?
 - (a) Salt + water
 - (b) Chalk powder + water
 - (c) Milk + water
 - (d) All three
- (ii) Which mixture shows settling of particles on standing?
 - (a) Salt + water
 - (b) Chalk powder + water
 - (c) Milk + water
 - (d) None
- (iii) Which mixture shows the Tyndall effect?
 - (a) Salt + water only
 - (b) Chalk powder + water only
 - (c) Milk + water
 - (d) Both chalk + water and milk + water
- (iv) Which mixture leaves a residue on ordinary filter paper?
 - (a) Salt + water
 - (b) Chalk powder + water
 - (c) Milk + water
 - (d) None

19. A cyclist moves as shown in the velocity–time graph. Use the graph to answer the following questions.



- (i) What is the acceleration from 0 s to 2 s?
 - (a) 1 m s⁻²
 - (b) 2 m s⁻²
 - (c) 4 m s⁻²
 - (d) 8 m s⁻²
- (ii) What is the displacement from 2 s to 6 s?

- (a) 8 m
 - (b) 12 m
 - (c) 16 m
 - (d) 24 m
- (iii) What does the horizontal portion of the graph represent?

- (a) Uniform velocity
- (b) Uniform acceleration
- (c) Zero displacement
- (d) Increasing acceleration

(iv) What is the total displacement from 0 s to 8 s?

- (a) 24 m
- (b) 28 m
- (c) 32 m
- (d) 36 m

20. A student performs an osmosis activity by placing two similar potato pieces in different solutions. Piece X is placed in pure water and swells, while piece Y is placed in concentrated salt solution and becomes smaller. Answer the following questions:

(i) Which process explains the movement of water through the cell membrane?

- (a) Diffusion
- (b) Osmosis
- (c) Active transport
- (d) Endocytosis

(ii) Pure water acts as which type of solution for the potato cells?

- (a) Hypertonic
- (b) Isotonic
- (c) Hypotonic
- (d) Saturated

(iii) The concentrated salt solution is:

- (a) Hypotonic
- (b) Hypertonic
- (c) Isotonic

(d) A true solution only

(iv) Which statement is correct?

- (a) Water moves from lower water concentration to higher water concentration.
- (b) Osmosis requires a selectively permeable membrane.
- (c) Solute particles always move through the membrane during osmosis.
- (d) Osmosis requires ATP energy.

— END OF QUESTION PAPER —