

SAMPLE PAPER 5

SCIENCE - CLASS IX

Exploration | Session 2026-27

Maximum Marks: 80

Time Allowed: 3 Hours

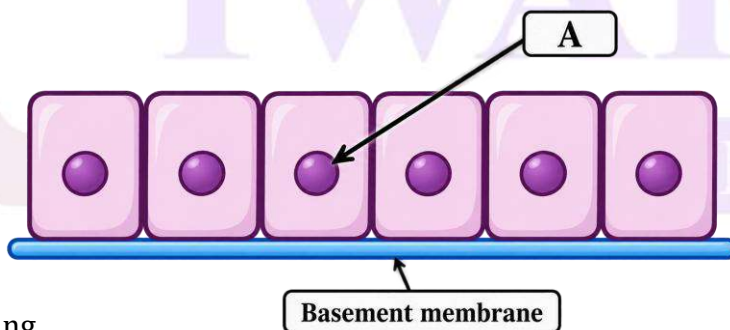
General Instructions

1. This question paper consists of 39 questions in five sections.
2. All questions are compulsory. Internal choice is provided in some questions; attempt only one alternative.
3. Section A contains 20 objective-type questions of 1 mark each.
4. Section B contains 6 Very Short Answer questions of 2 marks each.
5. Section C contains 7 Short Answer questions of 3 marks each.
6. Section D contains 3 Long Answer questions of 5 marks each.
7. Section E contains 3 case-based/data-based questions of 4 marks each.
8. Draw neat labelled diagrams wherever required and show complete working in numerical questions.

Section A (1 Mark Each)

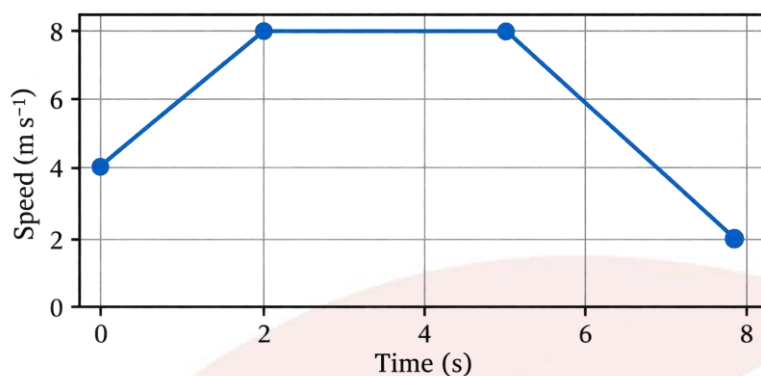
(Questions 1-16 are multiple-choice questions. Questions 17-20 are Assertion-Reason questions.)

1. Which is the best reason scientists revise models when new evidence becomes available?
(a) Models are never based on evidence
(b) A model should be improved when observations are not fully explained
(c) Every model must remain unchanged
(d) Models are only drawings
2. Which process would directly move water across a selectively permeable membrane from a dilute solution to a more concentrated solution?
(a) Osmosis
(b) Sublimation
(c) Sedimentation
(d) Evaporation
3. The diagram represents a layer of closely packed cells. Such an arrangement is especially suitable for:



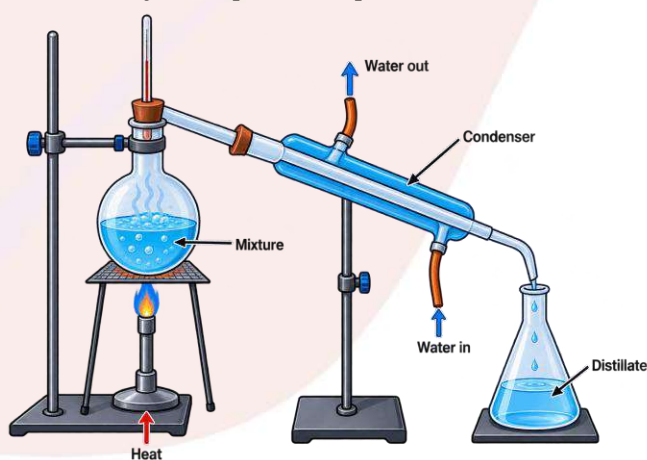
- (a) protection and lining
- (b) conducting water in plants
- (c) storing hereditary information
- (d) producing gametes

4. Study the speed-time graph. During which interval is the speed constant?



- (a) 0-2 s (b) 2-5 s (c) 5-8 s (d) none

5. The apparatus shown is used mainly to separate liquids on the basis of differences in:



- (a) boiling points
(b) magnetic properties
(c) particle size only
(d) colour

6. A body of mass 5 kg is accelerated at 2 m s^{-2} . The net force is:

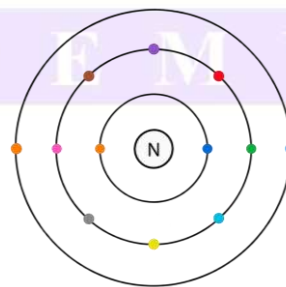
- (a) 2.5 N (b) 7 N (c) 10 N (d) 25 N

7. A machine has velocity ratio 5 and efficiency 80%. Its mechanical advantage is:

- (a) 4 (b) 5 (c) 6.25 (d) 0.16

8. The atomic model shown has electronic configuration:

- (a) 2,8,1
(b) 2,8,2
(c) 2,7,3
(d) 2,8,8



9. Which compound is formed mainly by sharing electrons?

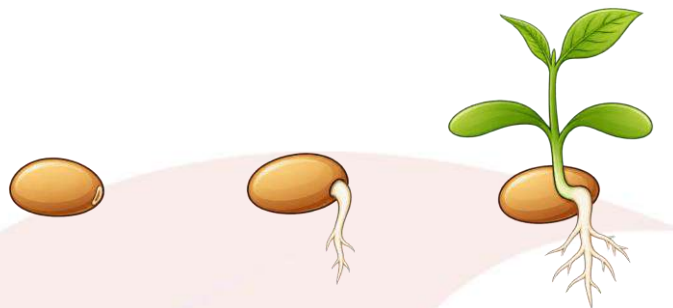
- (a) NaCl (b) CaO (c) CH₄ (d) MgCl₂

10. A sound wave has a small amplitude and high frequency. It will be perceived as:

- (a) loud and low-pitched
- (b) soft and high-pitched
- (c) loud and high-pitched
- (d) soft and low-pitched

11. The diagram shows stages of:

- (a) pollination
- (b) seed germination
- (c) binary fission
- (d) budding



12. Which pair is correctly matched?

- (a) Bryophyta - plants with seeds
- (b) Gymnosperms - naked seeds
- (c) Angiosperms - no vascular tissue
- (d) Fungi - photosynthetic organisms

13. Unequal heating of the Earth's surface is an important cause of:

- (a) winds
- (b) atomic structure
- (c) cell division
- (d) chemical bonding

14. Which organelle contains digestive enzymes that help break down worn-out cell components?

- (a) Lysosome
- (b) Ribosome
- (c) Chloroplast
- (d) Nucleolus

15. A student completes one full lap of a 200 m circular track and returns to the starting point. The displacement is:

- (a) 0 m
- (b) 100 m
- (c) 200 m
- (d) 400 m

16. Which mixture shows the Tyndall effect but does not settle readily on standing?

- (a) True solution
- (b) Colloid
- (c) Pure water
- (d) Pure salt

For Questions 17-20, choose:

- (a) Both A and R are true and R correctly explains A;
- (b) Both A and R are true but R does not explain A;
- (c) A is true but R is false;
- (d) A is false but R is true.

17. Assertion (A): The slope of a distance-time graph gives speed.

Reason (R): Speed is distance travelled per unit time.

18. Assertion (A): An inclined plane can reduce the effort required to raise a load.

Reason (R): It increases the distance through which the effort acts.

19. Assertion (A): Noble gases generally have zero valency.

Reason (R): Their outermost electron shells are complete.

20. Assertion (A): Covalent bonding involves sharing of electrons.

Reason (R): Shared electrons can help atoms attain more stable outer-shell configurations.

Section B (2 Marks Each)

(Questions 21-26 are Very Short Answer questions.)

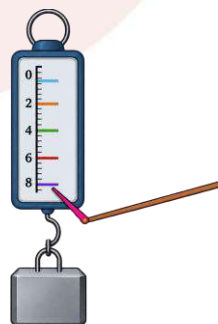
21. Why do plant cells generally not burst when placed in pure water even though water enters them by osmosis?

22. A car travels 120 m in 10 s and then 180 m in 15 s. Calculate its average speed for the complete journey.

23. State two differences between evaporation and boiling.

24. A 2 kg ball moving at 6 m s^{-1} is brought to rest. Calculate its initial momentum and the change in momentum.

25. A spring balance reading is 6 N for a hanging object. What does this reading represent? If $g = 10 \text{ m s}^{-2}$, calculate the object's mass.



26. An atom has mass number 31 and contains 16 neutrons. Find its atomic number and number of electrons if the atom is neutral.

Section C (3 Marks Each)

(Questions 27-33 are Short Answer questions.)

27. Explain the functions of the cell membrane, nucleus and vacuole. State one structural difference between a typical plant cell and animal cell.

28. A bus moving at 10 m s^{-1} accelerates uniformly to 22 m s^{-1} in 6 s. Calculate its acceleration and distance travelled during this time.

29. A solution contains common salt dissolved in water along with some insoluble sand. Describe how you would obtain dry sand and dry salt separately.

30. A 4 kg body moving at 5 m s^{-1} experiences a constant force of 8 N in the direction of motion for 3 s. Calculate its acceleration and final velocity.

31. A machine raises a 600 N load using an effort of 200 N. Calculate its mechanical advantage. If the effort moves 3 m while the load rises 0.8 m, calculate the velocity ratio and efficiency.

32. Element X has atomic number 19 and element Y has atomic number 17. Write their electronic configurations and explain the formation of the compound between them. Write its formula.

33. A sound wave of wavelength 0.75 m travels with a speed of 300 m s^{-1} . Calculate its frequency and time period. State which wave property determines pitch.

Section D (5 Marks Each)

(Questions 34-36 are Long Answer questions. Internal choice is provided.)

34.

- (a) Explain the structure and functions of xylem, phloem and epidermal tissue in plants.
- (b) How does the structure of cardiac muscle suit its function?

OR

- (a) Differentiate between epithelial, connective and muscular tissues with one example of each.
- (b) Explain the functions of tendons and ligaments.

35.

- (a) Explain the main stages of sexual reproduction in flowering plants: pollination, fertilisation, seed formation and fruit formation.
- (b) State the role of pollen grain and ovule.

OR

- (a) Compare asexual and sexual reproduction.
- (b) Explain binary fission, budding and vegetative propagation with one example each.

36.

- (a) Explain the major characteristics of Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms.
- (b) Distinguish between monocots and dicots.

OR

- (a) Describe the main features of Porifera, Cnidaria, Annelida, Arthropoda and Mollusca with one example each.
- (b) Why is classification based on multiple characteristics more useful than classification based on a single feature?

Section E (4 Marks Marks)

(Questions 37-39 are case-based/data-based questions with sub-parts.)

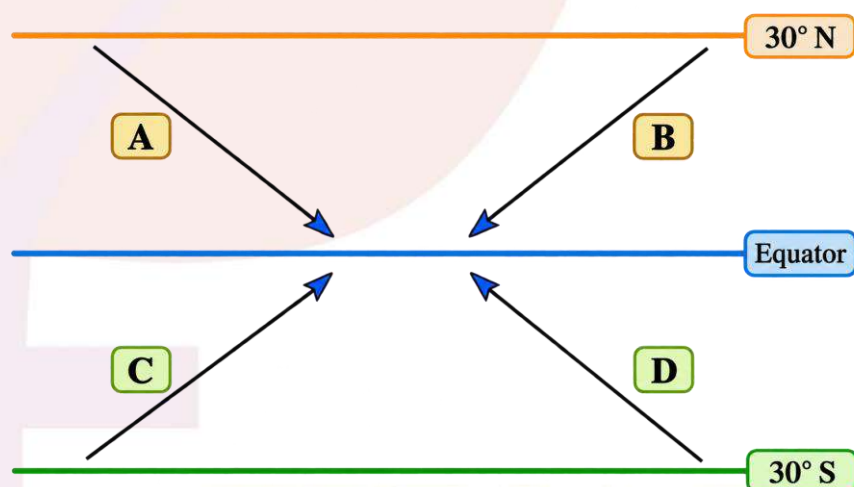
37. A 1000 kg car moving at 10 m s^{-1} increases its velocity uniformly to 16 m s^{-1} in 3 s.

- (a) Calculate its acceleration.
- (b) Calculate the net force acting on the car.
- (c) Calculate its initial momentum.
- (d) Calculate its final momentum.

38. A farmer grows new sugarcane plants using pieces of stem containing buds. In a nearby field, flowering plants form seeds after pollination and fertilisation.

- (a) Name the method of reproduction used in sugarcane.
- (b) Why can this method produce plants similar to the parent?
- (c) What is fertilisation?
- (d) State one advantage of sexual reproduction over vegetative propagation in terms of variation.

39. The diagram represents a simplified pattern of large-scale air movement caused by unequal solar heating of the Earth.



- (a) Why does air near strongly heated regions tend to rise?
- (b) What happens to surface air pressure where warm air rises?
- (c) State one role of unequal heating in producing winds.
- (d) How does Earth's rotation affect the direction of large-scale winds?