SAMPLE PAPER 2

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)

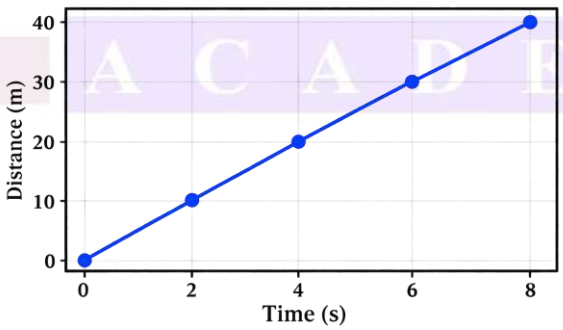
(Questions 1-16 are multiple-choice questions. Questions 17-20 are Assertion-Reason questions.)

1. Which statement best describes the purpose of a scientific model?
(a) It must include every detail of reality
(b) It simplifies a system to explain or predict its behavior
(c) It can never be changed
(d) It is always a physical object

2. Which cell structure controls the movement of substances into and out of a cell?
(a) Cell membrane (b) Ribosome (c) Chromosome (d) Centrosome

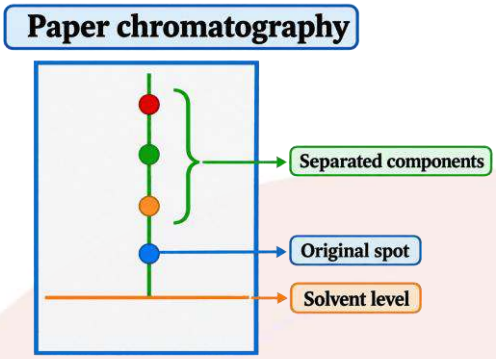
3. Which plant tissue provides flexibility to young stems and leaf stalks?
(a) Parenchyma
(b) Collenchyma
(c) Sclerenchyma
(d) Xylem

4. Study the graph. What is the speed of the object?



(a) 2 ms^{-1} (b) 5 m s^{-1} (c) 8 m s^{-1} (d) 10 m s^{-1}

5. The setup below shows separation of coloured substances in a mixture. Which property mainly causes the components to move different distances?

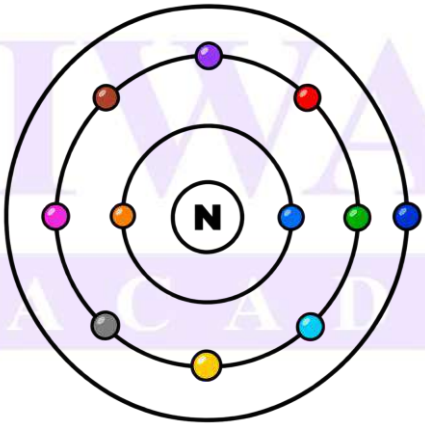


(a) Different attraction/solubility between stationary and mobile phases
(b) Different melting points only
(c) Magnetic properties
(d) Different densities only

6. A 4 kg body experiences a net force of 12 N. Its acceleration is:
(a) 48 m s^{-2} (b) 16 m s^{-2} (c) 3 m s^{-2} (d) 0.33 m s^{-2}

7. A ball held 5 m above the ground possesses energy mainly because of its:
(a) speed
(b) position in Earth's gravitational field
(c) temperature
(d) shape

8. The shell model shown represents an atom with electronic configuration 2, 8, 1. Which statement is correct?



(a) Its valency is 1 and it tends to lose one electron
(b) Its valency is 7
(c) It is chemically inert
(d) It tends to gain two electrons

9. Which formula is correct for aluminium oxide if the valencies of Al and O are 3 and 2 respectively?
(a) AlO (b) Al_2O_3 (c) Al_3O_2 (d) AlO_2

10. A sound becomes louder without changing its pitch. Which characteristic of the wave has mainly increased?
(a) Frequency (b) Amplitude (c) Speed (d) Wavelength only

11. Which is an example of asexual reproduction?
(a) Fusion of sperm and egg
(b) Seed formation after fertilization
(c) Budding in yeast
(d) Cross-pollination

12. Which group consists of organisms without a true membrane-bound nucleus?
(a) Monera (b) Protista (c) Fungi (d) Plantae

13. Which atmospheric gas is present in the largest proportion?
(a) Oxygen (b) Nitrogen (c) Carbon dioxide (d) Argon

14. Which organelle modifies, packages and dispatches materials in a cell?
(a) Golgi apparatus (b) Vacuole (c) Nucleus (d) Ribosome

15. A body changes its velocity from 10 m s^{-1} east to 10 m s^{-1} west. Which quantity has definitely changed?
(a) Speed only
(b) Velocity
(c) Mass
(d) Distance already travelled

16. Which of the following is a pure substance?
(a) Air (b) Soil (c) Distilled water (d) Milk

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): An object can have zero displacement even when the distance travelled is not zero.
Reason (R): Displacement depends only on initial and final positions.

18. Assertion (A): Machines can make work easier but cannot create energy.
Reason (R): In real machines, some input energy is usually dissipated due to friction.

19. Assertion (A): The mass number of an atom is the sum of its protons and neutrons.
Reason (R): Electrons contribute negligibly to the atomic mass compared with protons and neutrons.

20. Assertion (A): Covalent compounds generally do not conduct electricity.
Reason (R): They generally do not contain freely moving ions.

Section B (2 Marks Each)

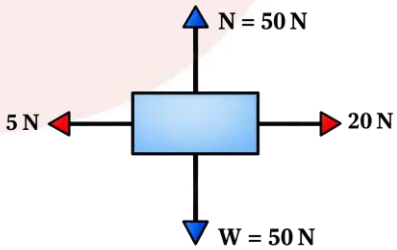
(Questions 21-26 are Very Short Answer questions.)

21. Why does a raisin swell when kept in water? What would happen if the swollen raisin were then placed in a concentrated sugar solution?

22. A runner covers 150 m in 30 s and then 100 m in the next 20 s. Calculate the average speed for the entire journey.

23. Differentiate between a true solution and a suspension on any two bases.

24. Study the force diagram below. Calculate the net horizontal force on the block and state the direction of acceleration.



25. A 500 W electric motor works for 20 s. Calculate the energy transferred by it. Write the SI unit of energy.

26. Write the electronic configurations of atoms with atomic numbers 8 and 12. State the valency of each.

Section C (3 Marks Each)

(Questions 27-33 are Short Answer questions.)

27. Explain the functions of mitochondria, ribosomes and lysosomes. Why are mitochondria often called the powerhouses of the cell?

28. A train moving at 15 m s^{-1} accelerates uniformly at 2 m s^{-2} for 5 s. Calculate its final velocity and displacement. State whether the motion is uniform or non-uniform.

29. How would you separate a mixture of iron filings, common salt and sand? Give the correct sequence and the principle used at each step.

30. A 6 kg trolley initially at rest is pushed by a constant force of 18 N for 4 s on a frictionless surface. Calculate its acceleration and final velocity. Name the law used.

31. A machine has mechanical advantage 4. If an effort of 75 N is applied, calculate the load lifted. Explain why the efficiency of a real machine is less than 100%.

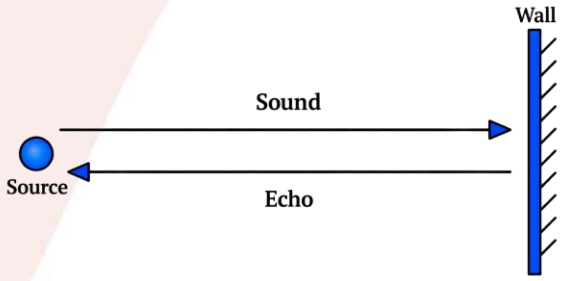
32. Magnesium reacts with chlorine to form magnesium chloride. Using electronic configurations, explain the transfer of electrons and formation of $MgCl_2$. Why is the resulting compound electrically neutral?

33. The diagram represents reflection of sound from a wall.

(a) If the echo is heard 0.4 s after the original sound and speed of sound is 340 m s^{-1}, calculate the distance of the wall.

(b) Why is the total distance travelled by sound twice the source-wall distance?

(c) State one condition needed to hear a distinct echo.



Section D (5 Marks Each)

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

34.

(a) Compare xylem and phloem with respect to their components and functions.

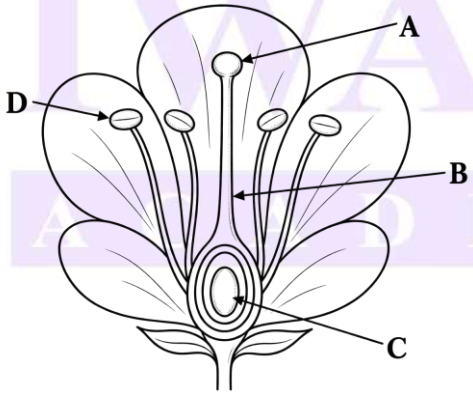
(b) Explain how epithelial tissue and connective tissue are structurally suited to their functions.

OR

(a) Compare parenchyma, collenchyma and sclerenchyma.

(b) Explain the structure and function of a neuron and state the role of nervous tissue.

35. Study the simplified flower shown below.



(a) Identify A, B, C and D.

(b) Explain how pollen reaches the stigma and how fertilisation takes place.

(c) State what the ovule and ovary become after fertilisation.

OR

(a) Differentiate between mitosis and meiosis in the context of reproduction.
(b) Explain budding and vegetative propagation with one example each.
(c) Why does sexual reproduction generally produce more variation than asexual reproduction?

36.
(a) State the basis of the five-kingdom classification and name the five kingdoms.
(b) Distinguish between monocot and dicot plants using any two features.

OR

(a) Explain the major characteristics of Arthropoda, Mollusca and Chordata with one example each.
(b) Why is binomial nomenclature useful in biology?

Section E (4 Marks Each)

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

37. A student compares two sound sources. Source P produces 240 vibrations in 0.4 s. Source Q produces 400 vibrations in 0.5 s. Both sounds travel through the same air.

(a) Calculate the frequency of source P.
(b) Calculate the frequency of source Q.
(c) Which source has the higher pitch?
(d) If the speed of sound is the same for both, which source has the shorter wavelength?

38. A gardener wants to multiply a desirable rose plant rapidly without waiting for seeds. In another experiment, a student observes yeast cells forming small outgrowths.

(a) Name one suitable artificial vegetative propagation method for the rose plant.
(b) State one advantage of vegetative propagation.
(c) Name the asexual reproductive method observed in yeast.
(d) Why are offspring formed by asexual reproduction generally called clones?

39. The diagram below shows part of the water cycle in an Earth system.

(a) Identify process A.
(b) Identify process B.
(c) What does process C represent?
(d) Explain one way in which large-scale deforestation can disturb this cycle.