

SAMPLE PAPER 4

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. A scientist studies a complex system using a simplified representation. Which statement about such a model is correct?

- (a) It contains every detail of the real system
- (b) It highlights features important for the investigation
- (c) It can never be modified
- (d) It always gives exact numerical predictions

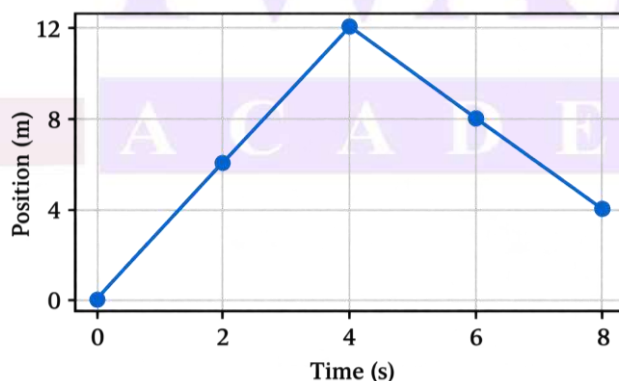
2. Which organelle contains genetic material and controls most activities of a eukaryotic cell?

- (a) Nucleus
- (b) Ribosome
- (c) Lysosome
- (d) Vacuole

3. Which tissue transports prepared food from leaves to other parts of a plant?

- (a) Xylem
- (b) Phloem
- (c) Sclerenchyma
- (d) Epidermis

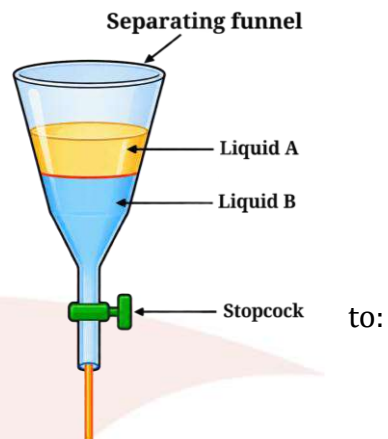
4. Study the position-time graph. During which interval does the object move back towards its starting position?



- (a) 0-2 s
- (b) 2-4 s
- (c) 4-8 s
- (d) It never moves back

5. The apparatus shown is most suitable for separating:

- (a) salt and water
- (b) kerosene and water
- (c) sand and iron filings
- (d) sugar and water



6. An atom has electronic configuration 2,8,7. It is most likely

- (a) lose 7 electrons
- (b) gain 1 electron
- (c) lose 1 electron
- (d) remain completely unreactive

7. A trolley is acted upon by the horizontal forces shown. What is the net force?

- (a) 10 N to the right
- (b) 26 N to the right
- (c) 10 N to the left
- (d) zero



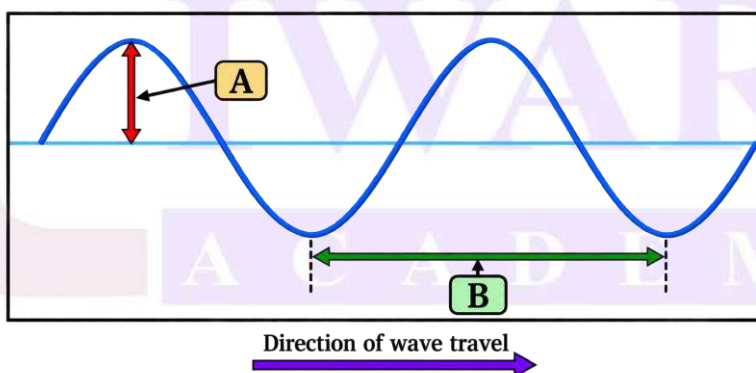
8. Which statement about work is correct?

- (a) Work is done whenever a force acts
- (b) Work is done only when force causes displacement with a component along the force
- (c) Work has no unit
- (d) Work is always positive

9. Which formula represents calcium chloride if calcium has valency 2 and chlorine has valency 1?

- (a) CaCl
- (b) Ca₂Cl
- (c) CaCl₂
- (d) Ca₂Cl₂

10. In the wave diagram, labels A and B represent respectively:



- (a) wavelength and amplitude
- (b) amplitude and wavelength
- (c) frequency and amplitude
- (d) speed and wavelength

11. Which reproductive process produces a new organism from a single parent without fusion of gametes?

- (a) Sexual reproduction
- (b) Asexual reproduction
- (c) Fertilisation
- (d) Pollination

12. Which group includes multicellular, heterotrophic organisms that generally ingest food and lack cell walls?

- (a) Plantae
- (b) Fungi
- (c) Animalia
- (d) Monera

13. Which process converts atmospheric nitrogen into compounds that plants can eventually use?

- (a) Nitrogen fixation
- (b) Transpiration
- (c) Respiration
- (d) Combustion

14. Which cell structure is the main site of protein synthesis?

- (a) Ribosome
- (b) Vacuole
- (c) Golgi apparatus
- (d) Cell wall

15. A person walks 6 m east and then 8 m north. The magnitude of displacement is:

- (a) 2 m
- (b) 10 m
- (c) 14 m
- (d) 48 m

16. Which method is best suited for obtaining salt from seawater on a large scale?

- (a) Evaporation
- (b) Filtration
- (c) Magnetic separation
- (d) Sublimation

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): A body can move with constant speed and still have acceleration.

Reason (R): Acceleration occurs whenever velocity changes in magnitude or direction.

18. Assertion (A): The efficiency of a real machine is generally less than 100%.

Reason (R): Some input energy is dissipated, for example due to friction.

19. Assertion (A): Isobars have the same mass number but different atomic numbers.

Reason (R): Isobars are atoms of different elements.

20. Assertion (A): Magnesium oxide is an ionic compound.

Reason (R): Magnesium transfers electrons to oxygen during its formation.

Section B (2 Marks Each)

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

21. What is plasmolysis? Under what type of external solution is plasmolysis observed in a plant cell?

22. A cyclist covers 60 m in 5 s and the next 90 m in 10 s. Calculate the average speed for the complete journey.

23. Why can filtration separate chalk powder from water but cannot separate dissolved common salt from water?

24. A 3 kg object accelerates at 4 m s^{-2} . Calculate the net force acting on it. What would its acceleration be if the same force acted on a 6 kg object?

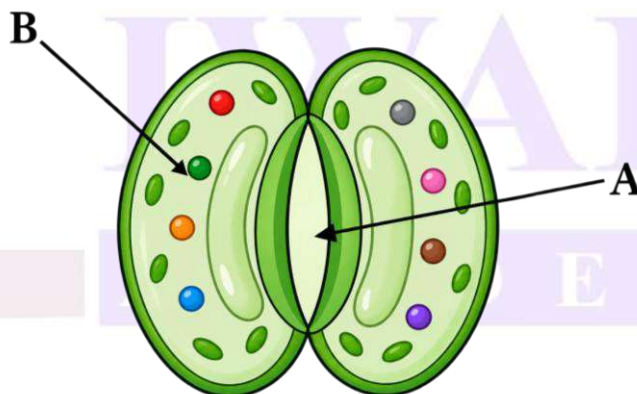
25. A machine lifts a 400 N load through 2 m when an effort does 1000 J of work. Calculate the useful output work and efficiency.

26. An atom has 13 electrons and 14 neutrons. Find its atomic number and mass number.

Section C (3 Marks Each)

(Questions 27-33 are Short Answer questions.)

27. Study the stomatal apparatus shown below.



Stomatal Apparatus (Schematic)

(a) Identify A and B.

(b) State one function of stomata.

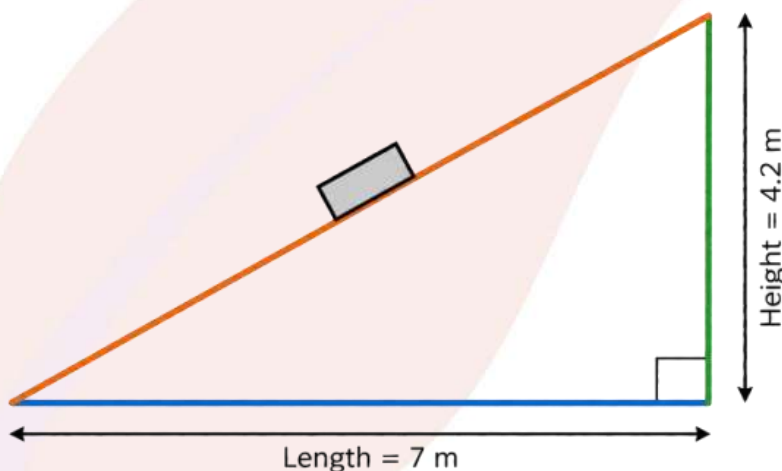
(c) Explain how guard cells help regulate gaseous exchange and water loss.

28. A car travelling at 25 m s^{-1} slows uniformly to 10 m s^{-1} in 5 s. Calculate its acceleration and distance travelled during this interval. Is the acceleration positive or negative?

29. A mixture contains oil, water and dissolved salt. Describe a suitable sequence of methods to obtain oil and salt separately from the mixture.

30. A 0.5 kg football initially at rest reaches a speed of 12 m s^{-1} after being kicked for 0.2 s. Calculate the change in momentum and average force exerted on the ball.

31. The inclined plane shown is 7 m long and 4.2 m high.



(a) If a 420 N load is raised ideally using the plane, calculate the ideal effort.

(b) Calculate the ideal mechanical advantage.

(c) State one reason why the actual effort would be greater.

32. Element P has atomic number 11 and element Q has atomic number 8. Write their electronic configurations, state their valencies and predict the formula of the compound they form.

33. A sound wave travels at 330 m s^{-1} and has frequency 660 Hz. Calculate its wavelength. If the frequency is doubled in the same medium, what happens to its wavelength and 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 parenchyma, collenchyma and sclerenchyma.

(b) Why are xylem and phloem called complex permanent tissues?

OR

(a) Compare skeletal, smooth and cardiac muscle tissues.

(b) Explain how the structure of a neuron is related to its function.

35.

- (a) Explain asexual reproduction by binary fission, budding and vegetative propagation, giving one example of each.
- (b) State two differences between asexual and sexual reproduction.

OR

- (a) Describe the main events from fertilisation to implantation in human reproduction.
- (b) Explain why gametes contain half the chromosome number of body cells.

36.

- (a) Explain the main characteristics of Monera, Protista, Fungi, Plantae and Animalia.
- (b) Why is scientific classification useful?

OR

- (a) Compare Pisces, Amphibia, Reptilia, Aves and Mammalia using any suitable distinguishing features.
- (b) Give one example of each group.

Section E (4 Marks Each)

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

37. A delivery cart of mass 20 kg moves at 3 m s^{-1} . A worker applies a net force of 10 N in the direction of motion for 4 s.

- (a) Calculate the acceleration of the cart.
- (b) Calculate the increase in velocity in 4 s.
- (c) Find its final velocity.
- (d) Calculate its final momentum.

38. A student studies reproduction in two organisms. A hydra develops a small outgrowth that grows and separates, while a flowering plant produces seeds after transfer of pollen and fusion of gametes.

- (a) Name the mode of reproduction in hydra.
- (b) What is the small outgrowth called?
- (c) Name the process of transfer of pollen from anther to stigma.
- (d) State one reason why seed-produced offspring generally show more variation than offspring produced by hydra in this way.

39. Study the simplified nitrogen-cycle diagram.

- (a) Process A ultimately makes atmospheric nitrogen available in soil compounds. Name the general process.
- (b) What transfer is represented by B from plants to animals?
- (c) What role do decomposers play at C?
- (d) Process D returns nitrogen to the atmosphere from soil nitrates. Name this process.

