

SCIENCE EXPLORATION

Sample Question Paper 4

Class IX | 2026-27

Time Allowed: 3 hours

Maximum Marks: 80

General Instructions

1. This paper contains 39 questions in three sections: A Biology, B Chemistry and C Physics. All questions are compulsory.
2. Each section has three internal choices. Attempt only one alternative wherever OR is given.
3. Marks are shown on the right. Show calculations and draw neat labelled diagrams where required.
4. Answer activity questions on paper; you do not need to perform the experiments. Use $g = 10 \text{ m s}^{-2}$ unless otherwise stated.

SECTION A

(Biology | Questions 1–16 | 30 marks)

1. Identify the scientific term: simple plants with bodies not differentiated into true roots, stems and leaves? **[1]**
(i) Gymnosperms (ii) Bryophytes
(iii) Pteridophytes (iv) Thallophytes
2. Identify the scientific term: a new plant arising from a root, stem or leaf? **[1]**
(i) Zygote (ii) Vegetative propagation
(iii) Ovum (iv) Condom
3. Identify the scientific term: a membrane network with ribosomes attached to its surface? **[1]**
(i) Chloroplast (ii) Rough endoplasmic reticulum
(iii) Central vacuole (iv) Leucoplast
4. Identify the scientific term: a piece of stem used to establish a new plant? **[1]**
(i) Pollen tube (ii) Stem cutting
(iii) Binary fission (iv) Oviduct
5. Identify the scientific term: joining the shoot of one plant to the rooted part of another? **[1]**
(i) Grafting (ii) Puberty
(iii) Filament (iv) Ovary of a flower

6. Identify the scientific term: a membrane network without attached ribosomes? [1]
(i) Osmosis (ii) Smooth endoplasmic reticulum
(iii) Leucoplast (iv) Chloroplast
7. Identify the scientific term: root formation on a stem while it is still attached to the parent? [1]
(i) Layering (ii) Self-pollination
(iii) Anther (iv) Cross-pollination
8. Identify the scientific term: raising plants from small pieces of tissue under controlled conditions? [1]
(i) Binary fission (ii) Tissue culture
(iii) Ovule (iv) Fertilisation
9. Identify the scientific term: the pollen-bearing part of a stamen? [1]
(i) Ovule (ii) Filament
(iii) Anther (iv) Stem cutting
10. Why do genetic studies provide deep information about living beings? [2]
11. A. Why is it important to cut the two potato pieces in roughly equal size and measure their initial weight before placing them in different liquids? [2]

OR

B. State one defining feature of each of the following: Cell membrane and Prokaryotic cell.

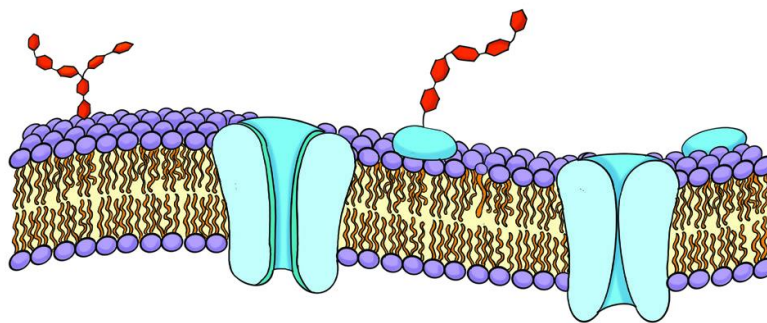
12. State one defining feature of each of the following: Anther and Grafting. [2]
13. A. A textbook states, "Each plant tissue performs only one specific function". What questions would you ask to critically examine the correctness of this statement? What examples of tissues would you take to find out the answers to these questions? [3]

OR

B. Write a short scientific note on Cuboidal epithelium and Parenchyma. Give one defining feature of each, then describe the role or significance of each.

14. A. The Figure represents a cell membrane.

[3]



- (a) Name its two major chemical components.
- (b) What does selectively permeable mean?
- (c) Why is this boundary important for a living cell?

OR

B. Write a short scientific note on Diffusion and Cell wall. Give one defining feature of each, then describe the role or significance of each.

15. The Figure shows a lawn being mown.

[4]



- (a) Which growth tissue helps grass regrow after trimming?
- (b) Where is this tissue found?
- (c) Why can removing the upper leaf portion leave growth possible?
- (d) How is this different from growth at a root tip?

16. Answer the following about Arthropoda and Annelida:

- (a) State one defining feature and one role of Arthropoda.
- (b) State one defining feature and one role of Annelida.
- (c) Give one application or example illustrating the significance of Arthropoda.

[5]

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Identify the scientific term: electrons in the outermost occupied shell?

[1]

- | | |
|-------------------------|--------------------|
| (i) Nucleus of an atom | (ii) Isobars |
| (iii) Valence electrons | (iv) Thomson model |

18. Identify the scientific term: the combining capacity of an atom? [1]
(i) Valency (ii) Bohr model
(iii) Dalton atomic theory (iv) Atomic number
19. Identify the scientific term: an atomic model with electrons embedded in diffuse positive charge? [1]
(i) Rutherford model (ii) Atomic number
(iii) K shell (iv) Thomson model
20. Identify the scientific term: an atomic model with a tiny dense positive nucleus and much empty space? [1]
(i) Neutron (ii) Rutherford model
(iii) Dalton atomic theory (iv) Electronic configuration
21. Identify the scientific term for an electrically neutral bonded group of atoms behaving as a unit. [1]
(i) Molecule (ii) Polyatomic ion
(iii) Covalent bond (iv) Law of conservation of mass
22. Identify the scientific term: a bonded group of atoms carrying an overall charge? [1]
(i) Polyatomic ion (ii) Molecular mass
(iii) Law of constant proportions (iv) Law of conservation of mass
23. Identify the scientific term: a symbolic representation of the composition of a substance? [1]
(i) Compound (ii) Molecular mass
(iii) Law of conservation of mass (iv) Chemical formula
24. Identify the scientific term: the simplest electrically neutral ratio of ions in an ionic solid? [1]
(i) Formula unit (ii) Cation
(iii) Ionic bond (iv) Compound
25. A. If a bromine atom is available in the form of, say two isotopes, $^{79}_{35}\text{Br}$ (49.7%) and $^{81}_{35}\text{Br}$ (50.3%), calculate the average atomic mass of the bromine atom. [2]

OR

B. A neutral model atom in a particle-counting task contains 13 protons and 13 neutrons. Determine its atomic number and mass number.

26. A. Write a short scientific note on Electronic configuration and Alpha particle. Give one defining feature of each, then describe the role or significance of each. [3]

OR

B. A neutral model atom in a particle-counting task contains 14 protons and 14 neutrons. Determine its atomic number and mass number. How many electrons does it contain?

27. Write a short scientific note on Sedimentation and Fractional distillation. Give one defining feature of each, then describe the role or significance of each. [3]

28. A student weighs only the liquid before and after a gas-forming reaction in an open vessel. Explain why this is an incomplete test of mass conservation. State the law governing the total mass in this reaction. Is the identity of an element determined by its proton number or by the number of molecules present? [4]

29. A. A milk-powder label is shown. It states that 100 g contains 26 g total fat. [5]



- (a) Express the fat content as a mass percentage.
- (b) How much fat is represented in 50 g of this powder?
- (c) Is the powder a single pure chemical compound? Give a reason.
- (d) What mass of the 100 g sample consists of components other than fat?
- (e) Why must the sample mass accompany the nutrient amounts on a label?

OR

B. Answer the following about Solution and Sedimentation:

- (a) State one defining feature and one role of Solution.
- (b) State one defining feature and one role of Sedimentation.
- (c) Give one application or example illustrating the significance of Solution.

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. A Tiwari Academy practice worksheet presents this problem. Identify the scientific term: the rate at which path length is covered? [1]

- | | |
|--------------------|------------------------------|
| (i) Speed | (ii) Uniform acceleration |
| (iii) Acceleration | (iv) Uniform circular motion |

31. Identify the scientific term: the gaseous envelope surrounding Earth? [1]

- | | |
|------------------|------------------------|
| (i) Water cycle | (ii) Nitrogen fixation |
| (iii) Atmosphere | (iv) Cryosphere |

32. Identify the scientific term: forces on the same object whose vector sum is zero? [1]

- | | |
|-------------------------|----------------------|
| (i) Newton's second law | (ii) Balanced forces |
| (iii) Momentum | (iv) Impulse |

33. A model predicts a result that an experiment repeatedly contradicts. State two checks a scientist should make. [2]

34. If the frequency of a sound wave produced by an oscillating piston of a long tube filled with air is 20 Hz, then how many oscillations does the piston complete per minute? [2]

35. A. A vehicle is fitted with an ultrasonic distance sensor as part of parking assistance system which provides echolocation, while the driver is reversing the vehicle. It emits ultrasonic wave (about 40 kHz) which is reflected by the obstacle. When the warning beep starts sounding at a distance of 1.2 m from the obstacle, how much time is taken by ultrasonic wave to travel to the obstacle and come back? Assume the speed of ultrasonic wave in air to be 345 m s^{-1} . [3]

OR

B. A vibrating blade completes 200 oscillations in 2 s. Find its frequency and time period. What happens to pitch if the source frequency increases?

36. A. Two teams pull a rope as shown in the Figure. [3]



- (a) What is the resultant of equal opposite pulls of 250 N?
(b) Does zero resultant force require the rope to accelerate?

(c) If one pull becomes 310 N and the opposing pull remains 250 N, find the resultant.

OR

B. Write a short scientific note on Conservation of momentum and Unbalanced forces. Give one defining feature of each, then describe the role or significance of each.

37. A bus is moving on a long straight highway with a velocity of 36 km h^{-1} . The driver presses the accelerator for a time interval of 10 s and velocity of the bus increases to 54 km h^{-1} . For some time, the bus moves at a constant velocity. Then, the driver notices an obstacle on the road ahead and presses the brake. The bus comes to a stop in a time interval of 5 s. Find the average acceleration in the two time intervals, (i) when the accelerator was pressed, and (ii) when the brakes were pressed.

[3]

38. The Figure illustrates carbon release by combustion.

[4]



- (a) Which carbon-containing gas is released when carbon burns completely?
- (b) Which major biological process can remove this gas using light energy?
- (c) Why does burning fossil fuel transfer carbon between Earth's stores?
- (d) How can increasing atmospheric carbon dioxide alter Earth's energy balance?

39. A. A hoist raises a 6 kg load through 3 m in 2 s at steady speed. Find the gain in gravitational potential energy and useful average power. Take $g = 10 \text{ m s}^{-2}$. Distinguish the units joule and watt. State the principle used when total energy is tracked through a change. Name one possible non-mechanical energy output in a real device.

[5]

OR

B. Answer the following about Watt and Negative work:

- (a) State one defining feature and one role of Watt.
- (b) State one defining feature and one role of Negative work.
- (c) Give one application or example illustrating the significance of Watt.