

SCIENCE EXPLORATION

Sample Question Paper 5

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: small non-vascular plants with rhizoids and a need for water in reproduction? [1]
(i) Thallophytes (ii) Bryophytes
(iii) Pteridophytes (iv) Gymnosperms
2. Identify the scientific term: the stalk supporting an anther? [1]
(i) Tissue culture (ii) Binary fission
(iii) Filament (iv) Uterus
3. Identify the scientific term: a stack of flattened membrane sacs associated with transport vesicles? [1]
(i) Chromoplast (ii) Plasmolysis
(iii) Golgi apparatus (iv) Eukaryotic cell
4. Identify the scientific term: the receptive surface at the top of the pistil? [1]
(i) Stigma (ii) Style
(iii) Binary fission (iv) Spore formation
5. Identify the scientific term: the part connecting the stigma to the ovary? [1]
(i) Fertilisation (ii) Oviduct
(iii) Style (iv) Uterus
6. Identify the scientific term: the swollen basal part of the pistil containing ovules? [1]
(i) Stem cutting (ii) Ovary of a flower
(iii) Pollen tube (iv) Binary fission

7. Identify the scientific term: the structure inside the ovary containing the egg cell? [1]

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|----------------------|------------------------|
| (i) Sperm | (ii) Cross-pollination |
| (iii) Binary fission | (iv) Ovule |

8. Identify the scientific term: a usually green outer floral part enclosing a bud? [1]

- | | |
|-----------------|---------------------|
| (i) Pollen tube | (ii) Stem cutting |
| (iii) Sepal | (iv) Binary fission |

9. Identify the scientific term: a commonly coloured or scented floral part? [1]

- | | |
|--------------|-------------------|
| (i) Oviduct | (ii) Petal |
| (iii) Anther | (iv) Stem cutting |

10. During a Tiwari Academy science-club session, a group works on this task. State one defining feature of each of the following: Plasmolysis and Cell wall. [2]

11. A. State one defining feature of each of the following: Adipose tissue and Intercalary meristem. [2]

OR

B. State one defining feature of each of the following: Phloem and Platelet.

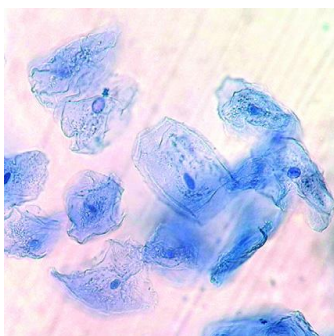
12. A. Instead of many small ones, why does a cell not have a single giant mitochondrion? How does this relate to the concept of surface area? [2]

OR

B. State one defining feature of each of the following: Smooth endoplasmic reticulum and Chloroplast.

13. If you were asked to revise the five kingdom classification, would you create a separate category for viruses or keep them outside the system? Justify your answer and explain what this indicates about the evolving nature of scientific classification. [3]

14. A. The Figure shows stained human cheek cells. [3]



(a) What is the dark-stained internal body in a typical cell?

- (b) Is a cell wall expected around these cells?
 (c) Why is staining useful here?

OR

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

15. Two entries on a science display have lost their headings.

A: Animals with jointed appendages and an external skeleton.

B: A naming system using a genus name and a specific epithet.

Identify both entries. For each, state its role and link it to a relevant feature.

[4]

16. The Figure shows xylem tissue.

[5]



- (a) What substances are transported by its conducting elements?
 (b) Name one conducting cell type in xylem.
 (c) Why is xylem called a complex tissue?
 (d) What property of many xylem walls also provides support?
 (e) Predict one effect of severely blocking its conducting elements.

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. For the reaction $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$, count the hydrogen and oxygen atoms on each side and state whether the equation conserves atoms.

[1]

18. Identify the scientific term: the sum of atomic masses of all atoms in one molecule?

[1]

(i) Law of constant proportions

(ii) Molecule

(iii) Molecular mass

(iv) Chemical formula

19. Identify the scientific term: the sum of atomic masses represented in an ionic formula unit?

[1]

(i) Formula unit mass

(ii) Molecular mass

(iii) Law of constant proportions

(iv) Element

20. Identify the scientific term: the rule that total mass remains unchanged during a chemical reaction in a closed system? [1]

- | | |
|---------------|----------------------------------|
| (i) Molecule | (ii) Law of conservation of mass |
| (iii) Element | (iv) Formula unit mass |

21. Identify the scientific term: the rule that a pure compound has a fixed mass ratio of its elements? [1]

- | | |
|-----------------------------------|---------------------|
| (i) Formula unit mass | (ii) Polyatomic ion |
| (iii) Law of constant proportions | (iv) Compound |

22. Identify the scientific term: a pure substance consisting of one kind of atom? [1]

- | | |
|--------------------|----------------------------------|
| (i) Molecular mass | (ii) Element |
| (iii) Cation | (iv) Law of conservation of mass |

23. Identify the scientific term: a substance containing different elements chemically combined in a fixed proportion? [1]

- | | |
|-----------------------------------|----------------|
| (i) Anion | (ii) Atomicity |
| (iii) Law of constant proportions | (iv) Compound |

24. Identify the scientific term: the number of atoms present in a molecule of an element? [1]

- | | |
|---------------------------------|---------------------|
| (i) Law of conservation of mass | (ii) Atomicity |
| (iii) Compound | (iv) Molecular mass |

25. Why do immiscible liquids form two separate layers in a separating funnel? [2]

26. A. Compare evaporation, crystallization and distillation. In which situation, would you prefer each of these over the others? [3]

OR

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

27. A. Write a short scientific note on Mass number and Neutron. 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 15 protons and 15 neutrons. Determine its atomic number and mass number. How many electrons does it contain?

28. The vinegar label in the Figure specifies 5% v/v acetic acid.

[4]



- (a) Interpret 5% v/v.
- (b) How much acetic acid is present in 200 mL of this vinegar?
- (c) Which component is the main solvent?
- (d) Does 5% v/v mean 5 mL acid plus exactly 100 mL water? Explain.

29. A. Answer the following about Valency and Electron:

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

[5]

OR

B. A neutral model atom in a particle-counting task contains 16 protons and 16 neutrons. Determine its atomic number and mass number. How many electrons does it contain? If it loses one electron, what is its charge? Would adding one neutron change its element? Explain.

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. Identify the scientific term: the Earth's liquid water in oceans, rivers, lakes and groundwater?

[1]

- | | |
|---------------------|------------------|
| (i) Denitrification | (ii) Hydrosphere |
| (iii) Lithosphere | (iv) Albedo |

31. Identify the scientific term: the rate of change of position with direction?

[1]

- | | |
|--------------------|--------------------|
| (i) Acceleration | (ii) Velocity |
| (iii) Displacement | (iv) Average speed |

32. Identify the scientific term: the Earth's snow and ice?

[1]

- | | |
|-------------------|-----------------|
| (i) Water cycle | (ii) Cryosphere |
| (iii) Ozone layer | (iv) Sea breeze |

33. A. A crane lifts a mass m to the 10th floor of a building in a certain time. It then raises the same mass to the 20th floor of the same building in double the time. How much more energy and power are required? Assume that the height of all floors is equal. [2]

OR

B. While saving a goal, a goalkeeper's hand moved back by 15 cm as she stopped a ball while applying a force of 200 N. How much work did the goalkeeper do on the ball in stopping it?

34. Explain the different purposes of a scientific law and a scientific theory. [2]

35. A. Answer the following about Infrasound and Ultrasound:

(a) State one defining feature and one role of Infrasound.

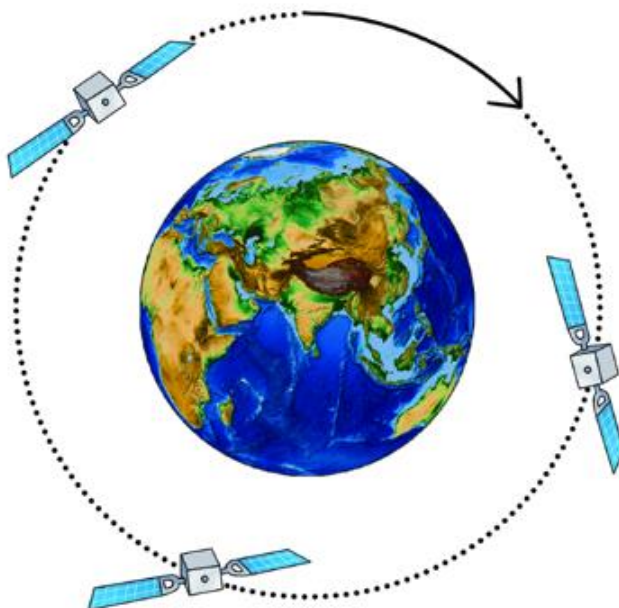
(b) State one defining feature and one role of Ultrasound.

(c) Give one application or example illustrating the significance of Infrasound. [5]

OR

B. A vibrating source makes 220 oscillations each second in air where sound travels at 340 m s^{-1} . Find its time period and wavelength. What happens to pitch if the source frequency increases? Explain why the wave requires a material medium. Do medium particles travel all the way from source to receiver? Explain.

36. The Figure represents a satellite moving around Earth. [3]



(a) Name the idealised type of motion when the orbit is circular and speed is constant.

(b) Does constant orbital speed mean constant velocity?

(c) What is the satellite's displacement after one complete orbit?

37. A man of mass 60 kg rides a scooter of mass 100 kg. He accelerates the scooter to a velocity v . The next day, his son with a mass of 40 kg joins him as a passenger. If the scooter reaches the same speed on both days in the same time interval, what is the ratio of the fuel of the tank used on the two days? Assume that the energy transfer to the scooter happens entirely due to fuel, and no other losses occur due to air resistance and friction.

[3]

38. People are pushing a car in the Figure.

[4]



- (a) What determines whether the stationary car begins to accelerate?
- (b) If the total push is 900 N and resistance is 600 N, find the resultant.
- (c) For a 600 kg car, calculate the acceleration produced by that resultant.
- (d) Would doubling the mass while keeping the resultant unchanged double the acceleration?

39. A. Suppose there is a rise in atmospheric temperature on Earth. How would this affect the cryosphere, hydrosphere and biosphere?

[3]

OR

B. Write a short scientific note on Ozone layer and Cryosphere. Give one defining feature of each, then describe the role or significance of each.