

SCIENCE EXPLORATION

Sample Question Paper 3

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: a single parent cell dividing into two new individuals? [1]
(i) Filament (ii) Binary fission
(iii) Grafting (iv) Puberty
2. Identify the scientific term: dividing tissue arranged along the sides of stems and roots? [1]
(i) Ciliated epithelium (ii) Guard cells
(iii) White blood cell (iv) Lateral meristem
3. Identify the scientific term: dividing tissue at the bases of leaves or internodes in grasses? [1]
(i) White blood cell (ii) Cuboidal epithelium
(iii) Intercalary meristem (iv) Ciliated epithelium
4. Why are the epithelial tissues that line an animal's internal organs usually only one or a few cells thick? [1]
(i) To store food efficiently.
(ii) To provide maximum strength.
(iii) To allow quick exchange of materials across them.
(iv) To reduce friction.
5. Identify the scientific term: living elongated cells with unevenly thickened corners? [1]
(i) Collenchyma (ii) Sclerenchyma
(iii) Smooth muscle (iv) Cuboidal epithelium

6. Identify the scientific term: a small outgrowth developing on a parent and later separating? [1]

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|-------------------|--------------|
| (i) Grafting | (ii) Budding |
| (iii) Pollen tube | (iv) Stigma |

7. Identify the scientific term: production of tiny reproductive units in a sporangium? [1]

- | | |
|-----------------------|-------------|
| (i) Tissue culture | (ii) Sepal |
| (iii) Spore formation | (iv) Anther |

8. Identify the scientific term: cells with very thick lignified walls, usually dead at maturity? [1]

- | | |
|-----------------------|-------------------|
| (i) Guard cells | (ii) Sclerenchyma |
| (iii) Apical meristem | (iv) Chlorenchyma |

9. Identify the scientific term: parenchyma containing many chloroplasts? [1]

- | | |
|---------------------------|------------------|
| (i) Chlorenchyma | (ii) Guard cells |
| (iii) Ciliated epithelium | (iv) Epidermis |

10. State one defining feature of each of the following: Sperm and Anther. [2]

11. A. The Figure shows a young seedling with growing root and shoot tips. [2]



(a) Name the meristem responsible for tip elongation.

(b) How does it increase the number of cells?

OR

B. State one defining feature of each of the following: Squamous epithelium and Skeletal muscle.

12. A. Explain why the menstrual cycle stops during pregnancy. [2]

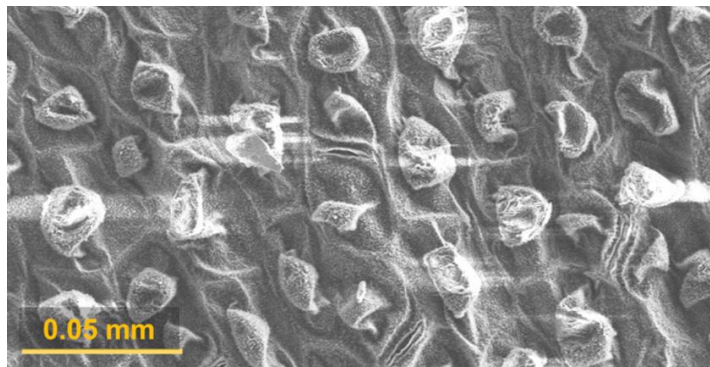
OR

B. State one defining feature of each of the following: Oviduct and Spore formation.

13. Write a short scientific note on Cell membrane and Plasmolysis. Give one defining feature of each, then describe the role or significance of each. [3]

14. Write a short scientific note on Nematoda and Protista. Give one defining feature of each, then describe the role or significance of each. [3]

15. A. The Figure is a micrograph of the lower surface of a leaf. [4]



- (a) Name the pores visible in the leaf surface.
- (b) Which cells regulate the width of these pores?
- (c) State one gas that enters through them for photosynthesis.
- (d) Name the water-loss process associated with these pores.

OR

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

A: A membrane network with ribosomes attached to its surface.

B: A stack of flattened membrane sacs associated with transport vesicles.

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

16. Answer the following about Bryophytes and Amphibia:

- (a) State one defining feature and one role of Bryophytes.
- (b) State one defining feature and one role of Amphibia.
- (c) Give one application or example illustrating the significance of Bryophytes. [5]

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. At a Tiwari Academy science workshop, students discuss the following task. Identify the scientific term: a mixture whose composition is not uniform throughout? [1]

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|-------------------|----------------------------|
| (i) Evaporation | (ii) Heterogeneous mixture |
| (iii) Decantation | (iv) Solution |

18. Identify the scientific term: the number of protons in an atom's nucleus? [1]

- | | |
|-------------------|--------------------|
| (i) Atomic number | (ii) K shell |
| (iii) Isotopes | (iv) Thomson model |

19. Identify the scientific term: the sum of protons and neutrons in a nucleus? [1]
(i) Isobars (ii) Mass number
(iii) Electron (iv) Alpha particle
20. Identify the scientific term: atoms of the same element with different neutron numbers? [1]
(i) Isotopes (ii) Rutherford model
(iii) Thomson model (iv) Neutron
21. Identify the scientific term: atoms of different elements with the same mass number? [1]
(i) Isobars (ii) Rutherford model
(iii) Nucleus of an atom (iv) L shell
22. Identify the scientific term: a homogeneous mixture with solute particles below about 1 nm? [1]
(i) Solution (ii) Heterogeneous mixture
(iii) Evaporation (iv) Filtration
23. Identify the scientific term: a heterogeneous mixture with particles that can settle on standing? [1]
(i) Filtration (ii) Tyndall effect
(iii) Crystallisation (iv) Suspension
24. Identify the scientific term: a dispersion with intermediate particle size that generally does not settle readily? [1]
(i) Filtration (ii) Solvent
(iii) Colloid (iv) Centrifugation
25. Both Rutherford's and Bohr's models have electrons orbiting the nucleus. Why did Rutherford's model fail to explain atomic stability, while Bohr's model succeeded? [2]
26. Fill in the blanks.
Among magnesium and chlorine, magnesium atom can give two electrons to become Mg^{2+} . However, chlorine can take only one electron to become _____. Now, _____ ion of magnesium and _____ ions of chlorine combine to give magnesium chloride. [3]
27. A. An atom with an atomic number of 26 has 56 nucleons. Find out its number of electrons, protons and neutrons. [3]

OR

B. A neutral model atom in a particle-counting task contains 9 protons and 9 neutrons. Determine its atomic number and mass number. How many electrons does it contain?

28. A. The Figure shows a visible light path through a dispersion.

[4]



- (a) Name the optical effect.
- (b) What causes the path to become visible?
- (c) Would a clean salt solution normally show the same clear path?
- (d) What broad particle-size conclusion follows from the observation?

OR

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

A: A mixture with uniform composition throughout a sample.

B: The medium in which another substance is dissolved.

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

29. A. Carbon burns in oxygen to form carbon dioxide. Why is the mass of carbon dioxide greater than the mass of the carbon consumed? 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? Explain why changing the amount of a pure compound does not change its formula.

[5]

OR

B. For calcium hydroxide, $\text{Ca}(\text{OH})_2$, use relative atomic masses $\text{Ca} = 40$, $\text{O} = 16$, $\text{H} = 1$. Calculate the formula unit mass and the total mass of 2 formula units in u. Explain why formula unit is used here rather than an isolated molecule. State whether multiplying the number of formula units changes their composition. What must the total ionic charge in a formula unit be?

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. Identify the scientific term: the vector sum of all forces acting on one object? [1]

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|----------------------------|----------------------|
| (i) Friction | (ii) Balanced forces |
| (iii) Action–reaction pair | (iv) Net force |

31. Identify the scientific term: the directed change from the initial to the final position? [1]

- | | |
|---------------------------|-------------------|
| (i) Displacement | (ii) Speed |
| (iii) Position–time graph | (iv) Acceleration |

32. Which observation best supports the idea that sound is a mechanical wave? [1]

- (i) Sound shows reflection
- (ii) Sound needs a medium to propagate
- (iii) Sound has frequency
- (iv) Sound carries energy

33. A. Does the potential energy of an object near the surface of the Earth change if it moves with constant velocity in the horizontal direction? What if the object is gradually raised in the vertical direction? [2]

OR

B. A 50 N load acts 0.20 m from a lever pivot. An effort is applied 0.50 m on the other side. Find the load moment and effort needed for balance.

34. Describe one situation where an approximate answer is good enough, and one where you would need a very exact value. [2]

35. Study the water-cycle Figure. [5]

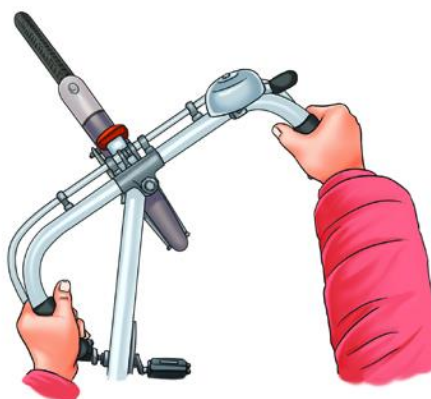


- (a) Name the transfer of liquid surface water into water vapour.
- (b) Name the conversion of water vapour into liquid droplets.
- (c) What is water falling from clouds called?

- (d) Which plant process releases water vapour through leaves?
(e) Why is the cycle a redistribution of water rather than creation of new water at every stage?

36. A. The Figure shows a bicycle's braking arrangement.

[3]



- (a) Which force helps slow the bicycle when brakes are applied?
(b) What is the direction of the braking effect relative to forward motion?
(c) Is the resultant force zero while the bicycle slows on a straight road?

OR

B. A stationary 4 kg test cart is acted on by a constant net force of 16 N for 2 s. Find its acceleration and final velocity. Explain what happens to acceleration if the same net force acts on twice the mass.

37. A. Write a short scientific note on Velocity and Acceleration. Give one defining feature of each, then describe the role or significance of each.

[3]

OR

B. A toy car slows uniformly from 9 m s^{-1} to rest in 2 s. Calculate its acceleration and stopping distance. State the SI unit of displacement.

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

A: Repeated motion about an equilibrium position.

B: The spatial separation of successive points in the same phase.

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

[4]

39. Which factors determine the energy required to raise a flag from the ground to the top of a tall flagpole using a pulley? Does raising the flag slowly or quickly change the amount of work done? If the speed at which the flag is raised is doubled, how does the power requirement change? Explain your answers.

[3]