

SCIENCE EXPLORATION

Sample Question Paper 13

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. Which of the following synthesises lipids and helps detoxify some substances? **[1]**
(i) Smooth endoplasmic reticulum (ii) Meiosis
(iii) Leucoplast (iv) Mitosis
2. Identify the scientific term: marine animals with spiny skin and a water vascular system? **[1]**
(i) Platyhelminthes (ii) Nematoda
(iii) Echinodermata (iv) Mollusca
3. Identify the scientific term: aquatic vertebrates generally having fins and gills? **[1]**
(i) Amphibia (ii) Aves
(iii) Pisces (iv) Mammalia
4. Identify the scientific term: spindle-shaped muscle cells without visible striations? **[1]**
(i) Smooth muscle (ii) Aerenchyma
(iii) Parenchyma (iv) Bone
5. Which of the following modifies, packages and dispatches cell products? **[1]**
(i) Smooth endoplasmic reticulum
(ii) Golgi apparatus
(iii) Cell membrane
(iv) Chromoplast

6. Identify the scientific term: branched striated muscle cells found in the heart? [1]
- | | |
|----------------------|-----------------------|
| (i) Neuron | (ii) Aerenchyma |
| (iii) Cardiac muscle | (iv) White blood cell |
7. Which of the following digests worn-out components and some foreign material? [1]
- | | |
|---------------|-----------------|
| (i) Meiosis | (ii) Lysosome |
| (iii) Nucleus | (iv) Leucoplast |
8. Which of the following synthesises proteins? [1]
- | | |
|---------------|----------------|
| (i) Ribosome | (ii) Meiosis |
| (iii) Osmosis | (iv) Cell wall |
9. Which of the following stores cell sap and helps maintain turgor? [1]
- | | |
|-----------------------------------|----------------------|
| (i) Nucleus | (ii) Eukaryotic cell |
| (iii) Rough endoplasmic reticulum | (iv) Central vacuole |
10. A. State one defining feature of each of the following: Tissue culture and Sperm. [2]
- OR**
- B. State one defining feature of each of the following: Zygote and Self-pollination.
11. A. A scientist discovers a new organism with the characteristic features of locomotion and autotrophic nutrition. Which character(s) would help the scientist identify the organism belonging to Protista according to the five kingdom classification? [2]
- OR**
- B. State one defining feature of each of the following: Echinodermata and Genus.
12. State one defining feature of each of the following: Xylem and Apical meristem. [2]
13. Write a short scientific note on Ligament and Bone. Give one defining feature of each, then describe the role or significance of each. [3]
14. Differentiate between the following pairs of terms based on the clues given in parentheses: [3]
- | |
|--|
| (i) Cell membrane and cell wall (permeability) |
| (ii) RER and SER (structure) |
| (iii) Chloroplasts and chromoplasts (pigments) |

15. The Figure shows a lion-tailed macaque.

[4]



- (a) Name its vertebrate class.
- (b) State a characteristic of this class that is visible.
- (c) Name another defining characteristic of the class.
- (d) Why is being able to climb not a defining mammalian feature?

16. A. The Figure illustrates a stem rooted while still connected to its parent plant.

[5]



- (a) Name this method.
- (b) What is the initial advantage of remaining attached?
- (c) When may the new plant be separated?
- (d) Does this method normally generate the variation produced by gamete fusion?
- (e) Give one observation that would show successful establishment after separation.

OR

B. Answer the following about Style and Menstruation:

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

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. If you could ask Rutherford one question about his work, what would it be? [1]

18. Which of the following links electron structure with combining behaviour? [1]

- | | |
|--------------------------------|---------------------|
| (i) Atomic number | (ii) Alpha particle |
| (iii) Electronic configuration | (iv) Proton |

19. Identify the scientific term: direct change of a solid into vapour followed by deposition on cooling? [1]

- | | |
|-------------------|----------------------|
| (i) Solvent | (ii) Crystallisation |
| (iii) Sublimation | (iv) Centrifugation |

20. Which of the following provided a basis for interpreting chemical laws? [1]

- | | |
|------------------------|---------------------------|
| (i) Valency | (ii) Dalton atomic theory |
| (iii) Rutherford model | (iv) Atomic number |

21. Identify the scientific term: separation caused by different movement with a mobile phase along a stationary phase? [1]

- | | |
|----------------------|-----------------|
| (i) Evaporation | (ii) Filtration |
| (iii) Chromatography | (iv) Solute |

22. Which entry is correctly associated with this feature: it has very small mass compared with a proton? [1]

- | | |
|---------------|-----------------|
| (i) Neutron | (ii) Bohr model |
| (iii) L shell | (iv) Electron |

23. Identify the scientific term: a metallic mixture containing two or more elements? [1]

- | | |
|--------------------|----------------------------|
| (i) Centrifugation | (ii) Alloy |
| (iii) Colloid | (iv) Heterogeneous mixture |

24. Which entry is correctly associated with this feature: it has approximately one atomic mass unit of mass? [1]

- | | |
|----------------|-----------------|
| (i) Valency | (ii) Bohr model |
| (iii) Electron | (iv) Proton |

25. A. Why is distillation an effective method for separating a mixture of water and acetone? [2]

OR

B. Blood is an example of a colloidal mixture.

- (i) What would happen if blood behaved like a true suspension inside the body?
(ii) In a blood sample, identify the dispersed phase and the dispersion medium.

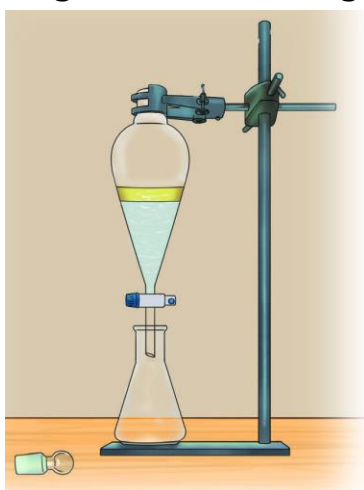
26. Two students obtain different masses of carbon dioxide by burning different masses of carbon completely. Must this contradict constant proportions? Explain. State the law governing the total mass in this reaction. [3]

27. A. Write a short scientific note on Valency and Atomic number. 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 10 protons and 12 neutrons. Determine its atomic number and mass number. How many electrons does it contain?

28. The Figure shows a separating funnel containing two liquid layers. [4]



- (a) What property is essential for this separation?
- (b) Which layer is drained first?
- (c) Why is the tap closed near the boundary of the layers?
- (d) Would this method separate alcohol completely mixed with water?

29. A. For magnesium chloride, MgCl_2 , use relative atomic masses $\text{Mg} = 24$, $\text{Cl} = 35.5$. Calculate the formula unit mass and the total mass of 6 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? [5]

OR

B. Answer the following about Relative atomic mass and Chemical formula:

- (a) State one defining feature and one role of Relative atomic mass.
- (b) State one defining feature and one role of Chemical formula.
- (c) Give one application or example illustrating the significance of Relative atomic mass.

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. Suppose, no net force is acting on an object. Which of the following situations are possible?

- (i) Object remains at rest if at rest.
- (ii) Object keeps moving with a constant velocity if already moving.
- (iii) Object is moving with a constant acceleration. [1]

31. Identify the scientific term: motion at constant speed around a circular path? [1]

- (i) Velocity–time graph
- (ii) Distance
- (iii) Speed
- (iv) Uniform circular motion

32. Identify the scientific term: daytime coastal airflow from sea towards warmer land in suitable conditions? [1]

- (i) Lithosphere
- (ii) Carbon cycle
- (iii) Sea breeze
- (iv) Mountain breeze

33. Two objects A and B of mass m and $4m$ have the same kinetic energy. What is the ratio of the magnitude of velocities of A and B? [2]

34. A Tiwari Academy practice worksheet presents this problem. A weather prediction says only “rain soon”. Rewrite it as a testable prediction and name one useful measurement. [2]

35. The Figure shows a moving ball striking the wicket. [3]



- (a) Which form of energy enables the moving ball to do work on the wicket?
- (b) What is the kinetic energy of a 0.16 kg ball moving at 20 m s^{-1} ?
- (c) How would doubling its speed affect that energy?

36. A. A student is trying to push a stationary block of 25 kg on a horizontal floor. The maximum force of friction opposing this motion is 50 N . Determine the displacement of the block in 2 seconds if Rahul pushes it with a constant force of (i) 50 N and (ii) 55 N in the forward direction. [3]

OR

B. Write a short scientific note on Newton's third law and Newton's second law. Give one defining feature of each, then describe the role or significance of each.

37. A car starts from rest and its velocity reaches 24 m s^{-1} in 6 s. Find the average acceleration and the distance travelled in these 6 s. [3]

38. A. How are mountain and valley breezes formed? Suppose there are two mountains, one covered with grass and another covered with barren rocks; would the temperature of the two mountain breezes be different? If so, how? [4]

OR

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

A: Night-time coastal airflow from cooler land towards relatively warmer sea.

B: The gaseous envelope surrounding earth.

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

39. A. A vibrating tuning fork touches water in the Figure. [5]



- (a) What does splashing water indicate about the fork?
- (b) Which property of sound production does the observation demonstrate?
- (c) What happens to sound as the fork's vibration dies away?
- (d) Does the fork need to touch a listener to be heard? Explain.
- (e) If the fork makes 256 vibrations in one second, what is its frequency?

OR

B. A vibrating source makes 380 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.