

# SCIENCE EXPLORATION

## Sample Question Paper 2

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. During a Tiwari Academy science-club session, a group works on this task. Identify the scientific term: actively dividing cells located at growing root and shoot tips? **[1]**  
(i) Neuron (ii) Bone  
(iii) White blood cell (iv) Apical meristem
2. Identify the scientific term: a membrane-bound compartment containing chromosomes? **[1]**  
(i) Plasmolysis (ii) Lysosome  
(iii) Nucleus (iv) Cell wall
3. Identify the scientific term: an organelle with an outer membrane and a highly folded inner membrane? **[1]**  
(i) Cell membrane (ii) Mitochondrion  
(iii) Smooth endoplasmic reticulum (iv) Mitosis
4. Identify the scientific term: single-celled organisms without a true nucleus? **[1]**  
(i) Protista (ii) Fungi  
(iii) Monera (iv) Animalia
5. Identify the scientific term: a green plastid containing chlorophyll-bearing internal membranes? **[1]**  
(i) Chloroplast (ii) Golgi apparatus  
(iii) Chromoplast (iv) Diffusion

6. Identify the scientific term: mostly unicellular eukaryotes with diverse modes of nutrition? [1]

- |                |               |
|----------------|---------------|
| (i) Fungi      | (ii) Plantae  |
| (iii) Animalia | (iv) Protista |

7. Identify the scientific term: eukaryotes that absorb nutrients and lack chlorophyll? [1]

- |                |             |
|----------------|-------------|
| (i) Plantae    | (ii) Fungi  |
| (iii) Animalia | (iv) Monera |

8. Identify the scientific term: multicellular eukaryotes generally containing chlorophyll? [1]

- |                |               |
|----------------|---------------|
| (i) Plantae    | (ii) Animalia |
| (iii) Protista | (iv) Fungi    |

9. Identify the scientific term: multicellular eukaryotes without cell walls? [1]

- |               |               |
|---------------|---------------|
| (i) Monera    | (ii) Protista |
| (iii) Plantae | (iv) Animalia |

10. The Figure shows roundworms. [2]



- (a) Name their group.  
(b) Describe their body shape.

11. A. State one defining feature of each of the following: Skeletal muscle and Neuron. [2]

**OR**

B. State one defining feature of each of the following: Cartilage and White blood cell.

12. A. What do you think will happen if there were no stomata in the epidermis of the stem or leaves?

[2]

**OR**

B. State one defining feature of each of the following: Skeletal muscle and Adipose tissue.

13. A student claims, "In humans, ovulation always happens on day 14 of the menstrual cycle". Critically examine this claim and state whether the claim is correct or not. Give at least two reasons for your answer.

[3]

14. A. A cross-section of a tree trunk is shown.

[3]



- (a) Name the visible concentric structures.
- (b) Which type of meristem contributes to increasing trunk girth?
- (c) What can counting suitable annual rings help estimate?

**OR**

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

15. Suresh prepares slides with pollen grains in different sugar concentrations (0%, 2.5%, 5%, 7.5%, 10%) to study the germination of pollen. (i) What are the different hypotheses which can be tested using this set-up? (ii) What parameters should be kept the same in this set-up?

[4]

16. Answer the following about Rough endoplasmic reticulum and Plasmolysis:

- (a) State one defining feature and one role of Rough endoplasmic reticulum.
- (b) State one defining feature and one role of Plasmolysis.
- (c) Give one application or example illustrating the significance of Rough endoplasmic reticulum.

[5]

## SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Identify the scientific term: a subatomic particle with one unit of negative charge? [1]

- |                        |               |
|------------------------|---------------|
| (i) Isotopes           | (ii) Neutron  |
| (iii) Rutherford model | (iv) Electron |

18. Identify the scientific term: a mixture with uniform composition throughout a sample? [1]

- |                     |                          |
|---------------------|--------------------------|
| (i) Centrifugation  | (ii) Crystallisation     |
| (iii) Sedimentation | (iv) Homogeneous mixture |

19. Identify the scientific term: an ion with a net positive charge? [1]

- |                      |                           |
|----------------------|---------------------------|
| (i) Chemical formula | (ii) Cation               |
| (iii) Molecule       | (iv) Relative atomic mass |

20. Identify the scientific term: a positively charged particle in an atomic nucleus? [1]

- |                       |              |
|-----------------------|--------------|
| (i) Valence electrons | (ii) Proton  |
| (iii) Mass number     | (iv) K shell |

21. When 20 g of hydrogen reacts completely with 160 g of oxygen, how much water is formed according to the Law of Conservation of Mass? [1]

22. Identify the scientific term: electrostatic attraction between oppositely charged ions? [1]

- |                  |                   |
|------------------|-------------------|
| (i) Atomicity    | (ii) Formula unit |
| (iii) Ionic bond | (iv) Element      |

23. Identify the scientific term: a bond formed when atoms share electron pairs? [1]

- |                                   |                    |
|-----------------------------------|--------------------|
| (i) Element                       | (ii) Covalent bond |
| (iii) Law of constant proportions | (iv) Atomicity     |

24. The nucleus of an atom contains 20 protons. If its mass number is 41, find the number of neutrons in it. [1]

25. Find the formula unit mass of potassium chloride (KCl). Atomic mass — K = 39 u; Cl = 35.5 u. [2]

26. A. A sealed flask gains a visible precipitate during a reaction but its measured total mass is unchanged. Does formation of a solid imply creation of matter? Explain. State the law governing the total mass in this reaction. [3]

**OR**

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

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

**OR**

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

28. The Figure shows sand dispersed in water. [4]



- (a) Classify this mixture as homogeneous or heterogeneous.
- (b) What is expected after it stands undisturbed?
- (c) Suggest a method for recovering the sand.
- (d) Why would ordinary filtration work here?

29. A. A neutral model atom in a particle-counting task contains 5 protons and 5 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. [5]

**OR**

B. Answer the following about Neutron and Valency:

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

## SECTION C

(Physics | Questions 30–39 | 25 marks)

30. Identify the scientific term: energy transferred when a force produces displacement with a component along it? [1]

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|-----------------------|---------------------|
| (i) Mechanical energy | (ii) Kinetic energy |
| (iii) Work            | (iv) Watt           |

31. Identify the scientific term: work done when force has a component along displacement? [1]

- |                     |            |
|---------------------|------------|
| (i) Power           | (ii) Lever |
| (iii) Positive work | (iv) Watt  |

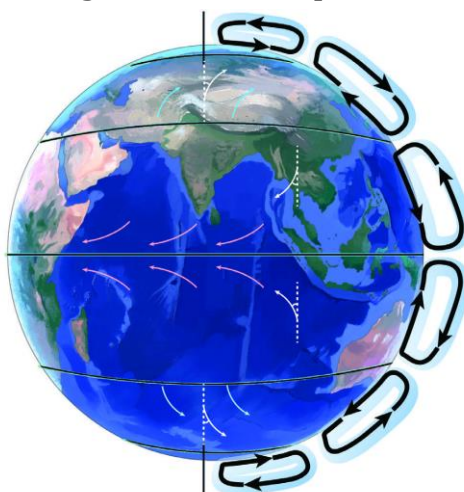
32. Identify the scientific term: the total length of the path actually followed? [1]

- |                            |                    |
|----------------------------|--------------------|
| (i) Distance               | (ii) Average speed |
| (iii) Uniform acceleration | (iv) Acceleration  |

33. A student models a falling stone but leaves out air resistance. Explain why this can be useful and state one limit of the model. [2]

34. What happens to the warm surface of water from the equator as it travels toward the poles? What impact does this movement have on the area? [2]

35. A. The Figure represents large-scale atmospheric circulation. [3]



- (a) What unequal energy input helps drive the circulation?
- (b) Why does warm air generally rise relative to cooler surrounding air?
- (c) What movement commonly replaces rising warm air near the surface?

**OR**

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

36. A. A truck driver driving at the speed of  $54 \text{ km h}^{-1}$  notices a road sign with a speed limit of  $40 \text{ km h}^{-1}$  for trucks. He slows down to  $36 \text{ km h}^{-1}$  in 36 s. What was the distance travelled by him during this time? Assume the acceleration to be constant while slowing down. [3]

OR

B. Write a short scientific note on Uniform motion and Reference frame. Give one defining feature of each, then describe the role or significance of each.

37. A. In one of their fastest deliveries, an Indian cricketer bowled a cricket ball with an approximate mass of 0.2 kg at a velocity of about  $154.8 \text{ km h}^{-1}$ . Calculate the kinetic energy of the ball at the time of its delivery. [3]

OR

B. A frictional force of 4 N opposes a sledge over 5 m. Find the work done by friction and the corresponding decrease in kinetic energy if no other force does work. Distinguish the units joule and watt.

38. Study the spring-balance arrangement in the Figure. [4]



- (a) Which physical quantity does the balance measure?
- (b) Name the SI unit used to report its reading.
- (c) For a stationary 0.4 kg load, calculate the reading using  $g = 10 \text{ m s}^{-2}$ .
- (d) What balances the load's downward weight at rest?

39. Answer the following about Reverberation and Frequency:

- (a) State one defining feature and one role of Reverberation.
- (b) State one defining feature and one role of Frequency.
- (c) Give one application illustrating the significance of Reverberation. [5]