

SCIENCE EXPLORATION

Sample Question Paper 14

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. Name the term: vertebrates with life histories connecting water and land? [1]
(i) Mammalia (ii) Reptilia
(iii) Pisces (iv) Amphibia
2. Which of the following combines useful shoot and rootstock characteristics? [1]
(i) Ovum (ii) Self-pollination
(iii) Cross-pollination (iv) Grafting
3. During a Tiwari Academy science-club session, a group works on this task. Which of the following selectively regulates movement of substances? [1]
(i) Prokaryotic cell (ii) Osmosis
(iii) Meiosis (iv) Cell membrane
4. Name the term: vertebrates commonly having dry scaly skin? [1]
(i) Amphibia (ii) Mammalia
(iii) Reptilia (iv) Pisces
5. Name the term: vertebrates characterised by feathers? [1]
(i) Amphibia (ii) Pisces
(iii) Aves (iv) Reptilia
6. Name the term: vertebrates with mammary glands and hair at some stage? [1]
(i) Aves (ii) Mammalia
(iii) Reptilia (iv) Amphibia

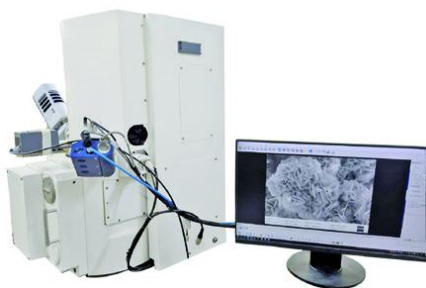
7. Name the term: the narrowest principal category in the school classification hierarchy? [1]
- (i) Platyhelminthes (ii) Species
(iii) Thallophytes (iv) Mammalia
8. Name the term: a taxonomic category containing closely related species? [1]
- (i) Genus (ii) Species
(iii) Biodiversity (iv) Bryophytes
9. Name the term: a taxonomic category grouping related genera? [1]
- (i) Amphibia (ii) Genus
(iii) Family (iv) Aves
10. Give one feature each of: Filament and Binary fission. [2]
11. A. Give one feature each of: Zygote and Testis. [2]

OR

- B. Give one feature each of: Vegetative propagation and Oviduct.
12. Coconut husk fibres are used for mats which are tough and fibrous. Which tissue has structural features suitable for providing this strength? Explain why living parenchyma couldn't serve the same purpose. [2]
13. A. For Rough endoplasmic reticulum and Nucleus, give one defining feature and one function or significance of each. [3]

OR

- B. For Mitosis and Nucleus, give one defining feature and one function or significance of each.
14. Give one defining feature and one role each of Smooth muscle and Apical meristem. Also give one application or example of Smooth muscle. [5]
15. An electron microscope is shown. [4]



(a) Why are microscopes needed to study most cells?

- (b) What advantage does an electron microscope have over a light microscope?
- (c) Distinguish magnification from resolution.
- (d) Why should a scale accompany a micrograph?

16. A. The Figure shows a joined shoot and rootstock.

[3]



- (a) Name the propagation technique.
- (b) What is the upper shoot portion called?
- (c) What does the rootstock supply?

OR

B. For Vegetative propagation and Budding, give one defining feature and one function or significance of each.

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Which electrically neutral particle can consist of bonded atoms of either one element or different elements?

[1]

- | | |
|--------------------|------------------------|
| (i) Polyatomic ion | (ii) Formula unit |
| (iii) Molecule | (iv) Formula unit mass |

18. Which entry is correctly associated with this feature: it has a mass close to that of a proton?

[1]

- | | |
|--------------------------|--------------|
| (i) Atomic number | (ii) Neutron |
| (iii) Nucleus of an atom | (iv) L shell |

19. Which entry is correctly associated with this feature: it equals the electron number only for a neutral atom?

[1]

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

20. Which entry is correctly associated with this feature: it is an integer for a specified isotope? [1]

- | | |
|---------------|------------------|
| (i) Proton | (ii) Mass number |
| (iii) Neutron | (iv) Bohr model |

21. Which of the following has components distributed uniformly? [1]

- (i) Solubility
- (ii) Tyndall effect
- (iii) Evaporation
- (iv) Homogeneous mixture

22. Which of the following contains distinguishable regions or dispersed phases? [1]

- | | |
|--------------------|----------------------------|
| (i) Tyndall effect | (ii) Heterogeneous mixture |
| (iii) Filtration | (iv) Sublimation |

23. Which of the following distributes a solute uniformly through a solvent? [1]

- | | |
|-----------------|------------------------------|
| (i) Decantation | (ii) Tyndall effect |
| (iii) Solution | (iv) Fractional distillation |

24. Which of the following temporarily disperses relatively large particles? [1]

- (i) Suspension
- (ii) Homogeneous mixture
- (iii) Crystallisation
- (iv) Simple distillation

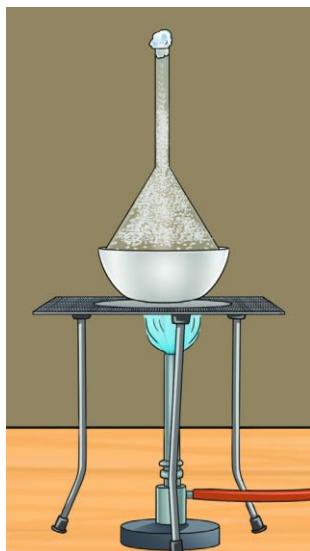
25. A. Clouds are made up of tiny water droplets or ice crystals floating in the air. Based on what you know about solutions, suspensions and colloids, what type of mixture do you think clouds are and why? [2]

OR

B. Your mother gives you a bottle of orange juice concentrate to mix with water and serve it to your visiting friends. She asks you to mix two tablespoons of the concentrate with water in a glass tumbler. If each tablespoon measures 15 mL and you make 150 mL of juice per person, what is the % v/v of orange juice concentrate in the mixture you prepared?

26. A. The Figure shows a heated solid mixture under an inverted funnel.

[3]



- (a) Name the separation process.
- (b) State a property needed by one component.
- (c) Where is the recovered solid expected to collect?

OR

B. For Crystallisation and Decantation, give one defining feature and one function or significance of each.

27. A. In the reaction $C + O_2 \rightarrow CO_2$, identify which reactant is an element made of two-atom molecules and which product is a compound. State the law governing the total mass in this reaction.

[3]

OR

B. For calcium carbonate, $CaCO_3$, use relative atomic masses $Ca = 40$, $C = 12$, $O = 16$. 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.

28. Name the following:

- (i) CO_2
- (ii) NO_2
- (iii) SF_6
- (iv) PCl_3

[4]

29. A neutral model atom in a particle-counting task contains 13 protons and 15 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]

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. When a net force acts on an object, we observe that the object accelerates: [1]

(i) opposite to the direction of force, with acceleration proportional to the force acting on the object.

(ii) opposite to the direction of force, with acceleration proportional to the mass of the object.

(iii) in the direction of force, with acceleration inversely proportional to the force acting on the object.

(iv) in the direction of force, with acceleration proportional to the force acting on the object.

31. Does the kinetic energy of an object which moves with constant velocity change with its position? [1]

32. Name the term: the chosen surroundings or coordinate system relative to which motion is described? [1]

(i) Speed

(ii) Reference frame

(iii) Position–time graph

(iv) Average speed

33. In a movie, while showing the explosion of a spacecraft in space, a flash of light is shown along with sound at the same time. What are the errors in this depiction? [2]

34. Why do scientists agree on standard units rather than using a different unit in every town? Give two reasons. [2]

35. A. A bus is travelling at 36 km h^{-1} when the driver sees an obstacle 30 m ahead. The driver takes 0.5 seconds to react before pressing the brake. Once the brake is applied, the velocity of the bus reduces with constant acceleration of 2.5 m s^{-2} . Will the bus be able to stop before reaching the obstacle? [3]

OR

B. A service vehicle travels for 16 s at 6 m s^{-1} and then waits for 3 s. Calculate distance and average speed over the complete interval. State the SI unit of displacement.

36. An object of mass 2 kg moving with a constant velocity of 10 m s^{-1} encounters a rough patch where the force of friction on the object is 7 N. At the same time, an additional constant force of 3 N opposing the motion is applied on the object. After entering the rough patch, how much distance does the object travel before coming to rest? [3]

37. Give one defining feature and one role each of Land breeze and Cryosphere. Also give one application or example of Land breeze. [5]

38. A. The Figure shows a pot falling from a height. [4]



- (a) Which energy store decreases while the pot falls?
- (b) Which form of energy increases before impact if air resistance is neglected?
- (c) For a 2 kg pot falling through 5 m, find the loss of potential energy. Take $g = 10 \text{ m s}^{-2}$.
- (d) If released from rest, what kinetic energy does it have just before impact under these assumptions?

OR

B. A 210 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. Distinguish joule from watt. State the law of energy conservation.

39. A. The Figure shows a listening experiment using a solid tabletop. [3]



- (a) What medium carries sound through the tabletop?
- (b) Does this demonstrate that sound travels only through air?
- (c) What carries the disturbance through the material?

OR

B. For Vibration and Ultrasound, give one defining feature and one function or significance of each.