

SCIENCE EXPLORATION

Sample Question Paper 11

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: two successive divisions that produce four cells with half the chromosome number? [1]
(i) Meiosis (ii) Diffusion
(iii) Eukaryotic cell (iv) Rough endoplasmic reticulum
2. Sponges represent one of the simplest animal body plans. Their bodies lack true tissues and organs. Which feature of sponge cells supports its classification under the animal kingdom? [1]
(i) Absence of mitochondria (ii) Ability to photosynthesise
(iii) Presence of a cell membrane (iv) Presence of a cell wall
3. Identify the scientific term: movement of water through a selectively permeable membrane from a more dilute to a more concentrated solution? [1]
(i) Osmosis (ii) Golgi apparatus
(iii) Plasmolysis (iv) Cell wall
4. Identify the scientific term: a developmental period with reproductive maturation and secondary sexual changes? [1]
(i) Spore formation (ii) Puberty
(iii) Ovule (iv) Grafting
5. Which process increases a unicellular population by dividing each parent into two daughter organisms? [1]
(i) Layering (ii) Binary fission
(iii) Uterus (iv) Pollen tube

6. Which of the following forms a new individual asexually? [1]
(i) Cross-pollination (ii) Budding
(iii) Sperm (iv) Oviduct
7. Which of the following helps reproduction and dispersal? [1]
(i) Spore formation (ii) Condom
(iii) Pollen tube (iv) Sperm
8. Which of the following multiplies selected plant characteristics? [1]
(i) Puberty (ii) Fertilisation
(iii) Anther (iv) Vegetative propagation
9. Identify the scientific term: withdrawal of a plant cell's living contents from its wall after substantial water loss? [1]
(i) Golgi apparatus (ii) Plasmolysis
(iii) Leucoplast (iv) Cell wall
10. Which phenomenon inhibits the formation of tumors in the human body? Can plants also develop tumors? Explain. [2]
11. A. The Figure shows small plantlets on a Bryophyllum leaf. [2]



- (a) Name the reproduction method illustrated.
(b) Which parent organ produces the plantlets?

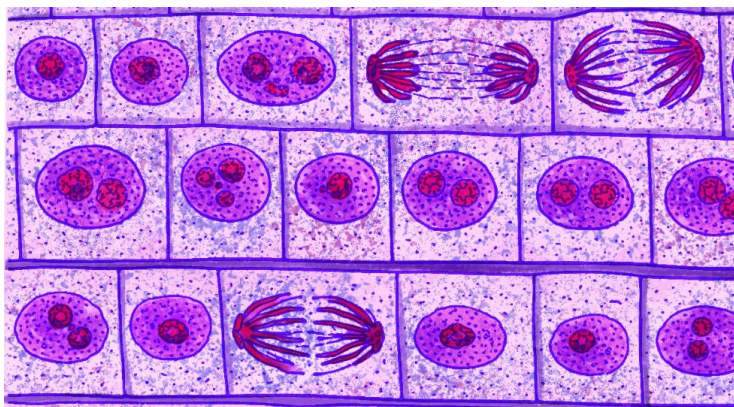
OR

B. State one defining feature of each of the following: Stem cutting and Fertilisation.

12. During a Tiwari Academy science-club session, a group works on this task. State one defining feature of each of the following: Aerenchyma and Guard cells. [2]

13. The Figure shows different stages in an onion root-tip preparation.

[3]



- (a) Why are root tips selected for observing division?
- (b) Name the ordinary division used for growth in this tissue.
- (c) How many daughter cells normally result from one such division?

14. A. For Amphibia and Class, give one defining feature and one function or significance of each.

[3]

OR

B. For Class and Gymnosperms, give one defining feature and one function or significance of each.

15. Identify the two entries described below.

A: A taxonomic category containing closely related species.

B: Plants with true roots, stems, leaves and vascular tissue but no seeds.

For each, state its function or significance and a relevant feature.

[4]

16. A. Answer the following about Skeletal muscle and Cuboidal epithelium:

- (a) State one defining feature and one role of Skeletal muscle.
- (b) State one defining feature and one role of Cuboidal epithelium.
- (c) Give one application or example of Skeletal muscle.

[5]

OR

B. Answer the following about Xylem and Phloem:

- (a) State one defining feature and one role of Xylem.
- (b) State one defining feature and one role of Phloem.
- (c) Give one application or example of Xylem.

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Which of the following are central to an atom's combining behaviour?

[1]

- (i) Dalton atomic theory
- (ii) Valence electrons
- (iii) Isobars
- (iv) Atomic number

18. Which of the following helps determine simple chemical formulae? [1]
(i) Nucleus of an atom (ii) Atomic number
(iii) Valency (iv) Isobars
19. Identify the scientific term: rapid spinning to accelerate separation of components of different densities? [1]
(i) Solubility (ii) Crystallisation
(iii) Evaporation (iv) Centrifugation
20. Which atomic model explains neutrality using electrons embedded in a diffuse sphere of positive charge? [1]
(i) Valency (ii) Thomson model
(iii) Bohr model (iv) Nucleus of an atom
21. Which entry is correctly associated with this feature: it follows formation of cations and anions by electron transfer in simple examples? [1]
(i) Relative atomic mass (ii) Compound
(iii) Ionic bond (iv) Law of constant proportions
22. What type of chemical bond is present in a solid compound that does not conduct electricity in the solid state but conducts electricity when dissolved in water? [1]
23. Which of the following accounts for the main gold-foil scattering observations? [1]
(i) Rutherford model (ii) Isobars
(iii) Electronic configuration (iv) K shell
24. Which of the following explains atomic stability within its assumptions? [1]
(i) Bohr model (ii) Mass number
(iii) Isobars (iv) Thomson model
25. A. Carbon monoxide (CO) contains carbon and oxygen in the mass ratio of 3:4. How much oxygen will combine with 9 g of carbon to form carbon monoxide? [2]

OR

- B. In a reaction, 4.0 g calcium carbonate and 2.92 g hydrochloric acid produce 4.44 g calcium chloride and 0.72 g water, along with carbon dioxide. Determine the carbon-dioxide mass.
26. For Homogeneous mixture and Heterogeneous mixture, give one defining feature and one function or significance of each. [3]

27. Two different atoms have 11 protons each, but one has 12 neutrons, and the other has 13 neutrons. How do their atomic numbers and mass numbers compare? Are they the same element or different elements? [3]

28. A. Write the formula for the following:

- (i) Sodium hydrogencarbonate
- (ii) Sulfur dioxide
- (iii) Ferric chloride
- (iv) Cuprous oxide

[4]

OR

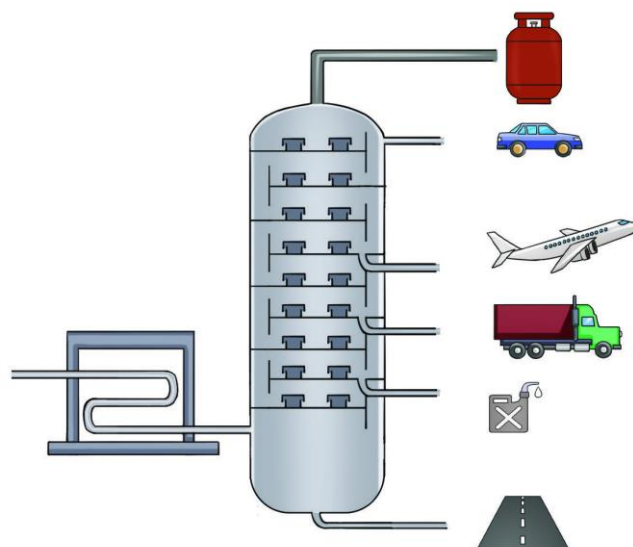
B. Identify the two entries described below.

A: Electrostatic attraction between oppositely charged ions.

B: An ion with a net negative charge.

For each, state its function or significance and a relevant feature.

29. A. The Figure represents a fractionating column used in refining petroleum. [5]



- (a) Why can a mixture yield several fractions?
- (b) What occurs repeatedly in a fractionating column?
- (c) Would a single pure substance give the same range of fractions?
- (d) Where do lower-boiling fractions generally travel before collection?
- (e) Why are several collection outlets useful?

OR

B. Answer the following about Tyndall effect and Filtration:

- (a) State one defining feature and one role of Tyndall effect.
- (b) State one defining feature and one role of Filtration.
- (c) Give one application or example of Tyndall effect.

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. Identify the scientific term: a graph whose vertical coordinate is position and horizontal coordinate is time? [1]

- | | |
|-------------------------------|--------------------------|
| (i) Position–time graph | (ii) Velocity–time graph |
| (iii) Uniform circular motion | (iv) Average speed |

31. Identify the scientific term: the fraction of incoming radiation reflected by a surface? [1]

- | | |
|---------------|------------------------|
| (i) Biosphere | (ii) Greenhouse effect |
| (iii) Albedo | (iv) Valley breeze |

32. Identify the scientific term: warming associated with atmospheric absorption and re-emission of outgoing thermal radiation? [1]

- | | |
|-----------------------|------------------------|
| (i) Nitrogen fixation | (ii) Greenhouse effect |
| (iii) Cryosphere | (iv) Mountain breeze |

33. A. Throughout history, many designs of perpetual machines (using wheels, weights or magnets) have been proposed but none actually work. Why do all real machines eventually slow down and stop? Explain in terms of work and energy. [2]

OR

B. A frictional force of 16 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.

34. A bicycle-travel model uses route length and average speed. Explain why the colour of the bicycle can usually be ignored. [2]

35. A sonar pulse in water of sound speed 1500 m s^{-1} returns after 0.12 s. Calculate its complete travel distance and the depth of the reflector directly below the source. 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. [5]

36. For Uniform circular motion and Velocity, give one defining feature and one function or significance of each. [3]

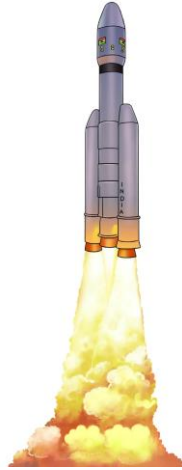
37. A. Explain how the Earth's atmosphere helps in maintaining a suitable temperature for life to survive on the Earth. [3]

OR

B. For Decomposition and Cryosphere, give one defining feature and one function or significance of each.

38. Observe the launching rocket in the Figure.

[4]



- (a) In which direction is gas expelled during upward thrust?
- (b) Which law explains the upward reaction force?
- (c) Must the rocket push against surrounding air to obtain thrust?
- (d) If upward thrust is 30,000 N and weight is 20,000 N, find the resultant ignoring drag.

39. A. A wheelchair is being pushed as shown in the Figure.

[3]



- (a) When the push is in the direction of displacement, what is the sign of its work?
- (b) A 40 N push moves the chair 3 m. Calculate work by this push.
- (c) If a 10 N resistance opposes this motion, calculate work by resistance.

OR

B. A 170 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 the units joule and watt.