

SCIENCE EXPLORATION
Sample Question Paper 12
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 propagates a plant from vegetative tissue? | [1] |
| (i) Stem cutting | (ii) Sperm |
| (iii) Filament | (iv) Ovulation |
| | |
| 2. Name the term: firm but flexible connective tissue with cells in a matrix? | [1] |
| (i) Plasma | (ii) Cardiac muscle |
| (iii) Cartilage | (iv) Areolar tissue |
| | |
| 3. Name the term: net spreading of particles from higher to lower concentration? | [1] |
| (i) Cell wall | (ii) Eukaryotic cell |
| (iii) Cell membrane | (iv) Diffusion |
| | |
| 4. Which of the following controls cellular activities through genetic information? | [1] |
| (i) Osmosis | (ii) Smooth endoplasmic reticulum |
| (iii) Ribosome | (iv) Nucleus |
| | |
| 5. Name the term: hard connective tissue with a mineralised matrix? | [1] |
| (i) Ligament | (ii) Sclerenchyma |
| (iii) Tendon | (iv) Bone |
| | |
| 6. Name the term: long striated muscle fibres usually under voluntary control? | [1] |
| (i) Intercalary meristem | (ii) Epidermis |
| (iii) Skeletal muscle | (iv) Cartilage |
| | |
| 7. Which organelle releases usable energy during aerobic cellular respiration? | [1] |
| (i) Eukaryotic cell | (ii) Mitochondrion |
| (iii) Nucleus | (iv) Prokaryotic cell |

8. Which of the following uses light energy to make food by photosynthesis? [1]
(i) Central vacuole (ii) Chloroplast
(iii) Cell membrane (iv) Mitosis

9. Which of the following helps synthesise and transport proteins? [1]
(i) Osmosis (ii) Chloroplast
(iii) Meiosis (iv) Rough endoplasmic reticulum

10. Give one feature each of: Uterus and Budding. [2]

11. Give one feature each of: Aerenchyma and Smooth muscle. [2]

12. A. Why do you think that a thick cuticle on the outer wall of epidermis is advantageous for a plant living in the desert but disadvantageous for a plant living underwater? [2]

OR

B. Give one feature each of: Areolar tissue and Epidermis.

13. A. For Chloroplast and Chromoplast, give one defining feature and one function or significance of each. [3]

OR

B. For Smooth endoplasmic reticulum and Ribosome, give one defining feature and one function or significance of each.

14. Does the term 'biodiversity' relate only to the variety of organisms, or does it encompass other elements? [3]

15. The Figure shows several organisms in a forest habitat. [4]



- (a) What term describes the variety of life in this scene?
- (b) Identify one producer visible in the scene.
- (c) Explain one way animals may depend on these plants.
- (d) Why is habitat alone insufficient for classifying all the organisms together?

16. A. The Figure shows a stem cutting growing in soil.

[5]



- (a) Name the propagation method.
- (b) What new structures must develop for an independent plant?
- (c) Is this sexual or asexual reproduction?
- (d) Why must the cutting contain suitable living growth tissue?
- (e) State one environmental factor that should be controlled in a comparison of cuttings.

OR

B. Give one defining feature and one role each of Uterus and Self-pollination. Also give one application or example of Uterus.

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Name the term: removing a volatile liquid without collecting its condensed vapour?

[1]

- | | |
|-----------------|---------------------|
| (i) Sublimation | (ii) Evaporation |
| (iii) Solution | (iv) Centrifugation |

18. Name the term: forming crystals from a suitable concentrated solution?

[1]

- | | |
|---------------------------|----------------------|
| (i) Sedimentation | (ii) Tyndall effect |
| (iii) Simple distillation | (iv) Crystallisation |

19. Name the term: vaporising a liquid and then condensing its vapour?

[1]

- | | |
|------------------|--------------------------|
| (i) Solution | (ii) Simple distillation |
| (iii) Filtration | (iv) Suspension |

20. Name the term: repeated vaporisation and condensation through a fractionating column?

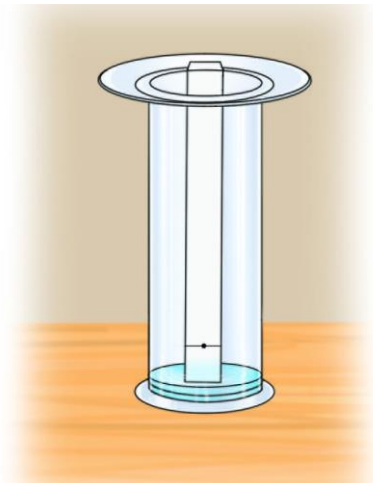
[1]

- | | |
|-----------------------------|--------------------|
| (i) Fractional distillation | (ii) Solution |
| (iii) Homogeneous mixture | (iv) Sedimentation |

21. Which of the following probes the distribution of positive charge in an atom? [1]
- | | |
|---------------------|-------------------------------|
| (i) Electron | (ii) Electronic configuration |
| (iii) Atomic number | (iv) Alpha particle |
22. Name the term: a vessel with a tap for draining one liquid layer from another? [1]
- | | |
|-----------------------|---------------------|
| (i) Separating funnel | (ii) Tyndall effect |
| (iii) Solvent | (iv) Sublimation |
23. Which of the following contains almost all atomic mass? [1]
- | | |
|----------------|-------------------------|
| (i) Bohr model | (ii) Nucleus of an atom |
| (iii) Valency | (iv) Rutherford model |
24. Which of the following holds at most two electrons in the simple model? [1]
- | | |
|---------------|------------------|
| (i) Proton | (ii) K shell |
| (iii) L shell | (iv) Mass number |
25. A. Why did Thomson conclude that electrons are present in all atoms? [2]

OR

- B. A neutral model atom in a particle-counting task contains 6 protons and 8 neutrons. Determine its atomic number and mass number.
26. At a Tiwari Academy science workshop, students discuss the following task. For Thomson model and Nucleus of an atom, give one defining feature and one function or significance of each. [3]
27. A. The Figure shows paper chromatography equipment. [3]



- (a) What is the moving liquid called?
- (b) Why should the initial sample spot lie above the solvent level?
- (c) Why can an ink spot separate into several bands?

OR

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

28. A carbon–oxygen reaction leaves some oxygen unreacted. Should this leftover oxygen be counted as newly formed product? Explain how it enters the mass balance. 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? **[4]**

29. A. A particular element (A) has one electron in its third shell. There is another element (B) with six electrons in its second shell.

(i) How many electrons does A tend to give or take to become stable?

(ii) What kind of ion would it form?

(iii) How many electrons does B tend to give or take to become stable?

(iv) What kind of ion would it form?

(v) If A and B were to combine, what kind of bond would be formed?

(vi) What would be the formula for the compound thus formed? **[5]**

OR

B. For magnesium oxide, MgO, use relative atomic masses $Mg = 24$, $O = 16$. Calculate the formula unit mass and the total mass of 5 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. Which of the following is primarily responsible for warming of the Earth? **[1]**

(i) Solar radiation is immediately absorbed by carbon dioxide, which then releases it as heat.

(ii) The atmosphere's tiny particles absorb incoming solar radiation, which directly heats the Earth.

(iii) The Earth's surface absorbs solar radiation, which is then re-radiated and trapped by greenhouse gases.

(iv) The Earth's environment is heated only by the solar radiation reflected by the clouds.

31. Name the term: a region of the stratosphere with relatively abundant ozone?

[1]

- (i) Ozone layer
(iii) Carbon cycle

- (ii) Lithosphere
(iv) Insolation

32. Name the term: a graph with velocity plotted against time?

[1]

- (i) Velocity–time graph
(iii) Uniform circular motion

- (ii) Acceleration
(iv) Distance

33. Why do you push an object closer to scissors fulcrum when you want to cut an object which is hard?

[2]

34. Give one example in which an approximate value is useful and one in which high precision is needed.

[2]

35. For Uniform motion and Speed, give one defining feature and one function or significance of each.

[3]

36. A. Discuss how human activities increase the concentration of greenhouse gases in the atmosphere. What would you do as an individual to reduce the emission of greenhouse gas?

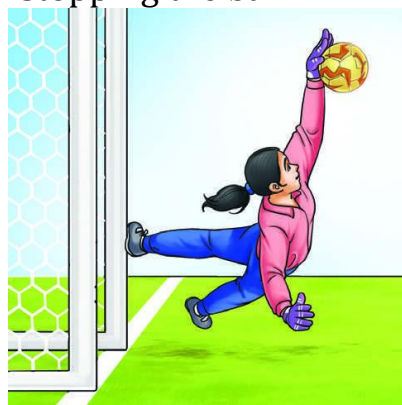
[3]

OR

B. For Albedo and Carbon cycle, give one defining feature and one function or significance of each.

37. A. Observe the goalkeeper stopping the ball.

[3]



(a) What is the sign of the work done by the stopping force on the moving ball?

(b) What happens to the ball's kinetic energy as it stops?

(c) A 0.5 kg ball initially moves at 10 m s^{-1} . Find its initial kinetic energy.

OR

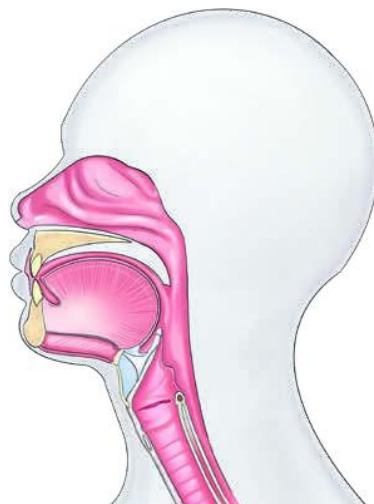
B. For Kinetic energy and Elastic potential energy, give one defining feature and one function or significance of each.

38. A 13 kg padded parcel travelling at 6 m s^{-1} stops in 0.5 s. Find the magnitude of its momentum change and average stopping force. Explain what happens to acceleration if the same net force acts on twice the mass. State whether the forces in a third-law pair act on the same body.

[4]

39. A. Observe the human sound-producing structures in the Figure.

[5]



- (a) Which structures vibrate to produce the voice?
- (b) What supplies the airflow needed to set them vibrating?
- (c) Which vibration property chiefly determines voice pitch?
- (d) What happens to pitch when that frequency increases?
- (e) Why does opening the mouth alone, without the relevant vibration, not necessarily produce a voiced sound?

OR

B. A vibrating blade completes 520 oscillations in 2 s. Find its frequency and time period. 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.