CBSE Class 9 Science

Sample Question Paper 2026-27 (Set 1)

Subject: Science (086) | **Class:** IX | **Textbook:** Exploration **Time Allowed:** 3 Hours | **Maximum Marks:** 80

Prepared by Sunbeam World School for practice. Based on the CBSE Class IX Science curriculum 2026-27 and the prescribed NCERT textbook.

General Instructions

1. This question paper contains **39 questions**. All questions are compulsory.
2. The paper is divided into **five Sections: A, B, C, D and E**.
3. **Section A** has 20 questions of 1 mark each, including two Assertion and Reason questions.
4. **Section B** has 6 questions of 2 marks each.
5. **Section C** has 7 questions of 3 marks each.
6. **Section D** has 3 questions of 5 marks each.
7. **Section E** has 3 case-based questions of 4 marks each.
8. Internal choice is provided in some questions. Attempt any one of the alternatives in such questions.
9. Draw neat labelled diagrams wherever necessary.
10. Use of a calculator is **not** permitted. Take g = 10 m/s² unless stated otherwise.

Blueprint: Unit-Wise Distribution

Unit	Unit Name	Marks
I	World of Living	27
II	Matter: Its Nature and Behaviour	25
III	Motion, Force, Work and Sound	23
IV	Earth as a System	5
	Total	**80**

Question type	Marks	Share
Competency focused (case based, application, assertion reason)	40	50%
Select response (MCQ)	16	20%
Constructed response (short and long answer)	24	30%

SECTION A

20 questions of 1 mark each

1. The basic structural and functional unit of life is the (a) tissue (b) cell (c) organ (d) organ system

2. Which organelle is known as the powerhouse of the cell? (a) ribosome (b) lysosome (c) mitochondrion (d) vacuole

3. Plasmolysis occurs when a plant cell is placed in a (a) hypotonic solution (b) isotonic solution (c) hypertonic solution (d) distilled water

4. Which of the following is a complex permanent tissue in plants? (a) parenchyma (b) collenchyma (c) xylem (d) sclerenchyma

5. Blood is a type of (a) epithelial tissue (b) connective tissue (c) muscular tissue (d) nervous tissue

6. The longest cell in the human body is the (a) muscle cell (b) nerve cell (c) bone cell (d) blood cell

7. Which of the following is a mixture? (a) distilled water (b) oxygen (c) air (d) sodium chloride

8. The process used to separate two miscible liquids with a difference in boiling points of less than 25 K is (a) simple distillation (b) fractional distillation (c) filtration (d) sublimation

9. The atomic number of an element is equal to the number of (a) neutrons (b) protons (c) protons and neutrons (d) electrons and neutrons

10. Isotopes of an element have the same (a) mass number (b) number of neutrons (c) atomic number (d) atomic mass

11. The chemical formula of calcium carbonate is (a) $CaCO_3$ (b) Ca_2CO_3 (c) CaC_2O_3 (d) $Ca(CO_3)_2$

12. One mole of any substance contains particles numbering (a) 6.022×10^{22} (b) 6.022×10^{23} (c) 6.022×10^{24} (d) 3.011×10^{23}

13. A body moving along a circular path at constant speed has (a) zero acceleration (b) constant velocity (c) changing velocity (d) zero displacement always

14. The SI unit of force is the (a) joule (b) watt (c) newton (d) pascal

15. Newton's third law of motion states that (a) force equals mass times acceleration (b) every action has an equal and opposite reaction (c) a body continues in its state unless acted upon by a force (d) momentum is always conserved in a closed system

16. The work done is zero when the angle between force and displacement is (a) 0° (b) 45° (c) 90° (d) 180°

17. Sound cannot travel through (a) solids (b) liquids (c) gases (d) vacuum

18. The audible range of frequency for a normal human ear is (a) 2 Hz to 200 Hz (b) 20 Hz to 20,000 Hz (c) 200 Hz to 2,00,000 Hz (d) above 20,000 Hz

19. Assertion and Reason. Assertion (A): Water is considered a universal solvent. **Reason (R):** Water dissolves a very large number of substances because of its polar nature. (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true but R is not the correct explanation of A (c) A is true but R is false (d) A is false but R is true

20. Assertion and Reason. Assertion (A): A body in uniform circular motion is said to be accelerating. **Reason (R):** Acceleration is the rate of change of velocity, and velocity is a vector quantity. (a) Both A and R are true and R is the correct explanation of A (b) Both A and R are true but R is not the correct explanation of A (c) A is true but R is false (d) A is false but R is true

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SECTION B

6 questions of 2 marks each

21. State two differences between a plant cell and an animal cell.

22. Define osmosis. Give one example from everyday life. **OR** What is a hypotonic solution? State what happens to an animal cell placed in it.

23. Differentiate between a mixture and a compound, giving one example of each.

24. Calculate the molar mass of water, H_2O. (Atomic masses: H = 1 u, O = 16 u)

25. A car travels 60 km in the first hour and 40 km in the next hour. Calculate its average speed.

26. Why do we hear an echo in a large empty hall but not in a small room?

SECTION C

7 questions of 3 marks each

27. Draw a labelled diagram of a plant cell showing any six parts.

28. Name the three types of muscular tissue and state one location of each in the human body. **OR** Explain the structure and function of xylem and phloem in plants.

29. List three differences between a solution, a colloid and a suspension.

30. Calculate the number of moles in 22 g of carbon dioxide, CO_2. (Atomic masses: C = 12 u, O = 16 u)

31. State Newton's second law of motion. A force of 20 N acts on a body of mass 4 kg initially at rest. Find the acceleration produced and the velocity after 5 seconds.

32. Define work. A force of 15 N moves a body through 4 m in the direction of the force. Calculate the work done. **OR** Define power and state its SI unit. A machine does 600 J of work in 20 seconds. Find its power.

33. Explain how sound is produced and propagated through air, using the terms compression and rarefaction.

SECTION D

3 questions of 5 marks each

34. (a) Draw a labelled diagram of an animal cell showing the nucleus, cell membrane, mitochondria, Golgi apparatus and endoplasmic reticulum. **(3)** (b) State one function each of the nucleus and the cell membrane. **(2) OR** (a) What are tissues? Classify plant tissues with the help of a flow chart. **(3)** (b) State two functions of meristematic tissue. **(2)**

35. (a) State the postulates of Dalton's atomic theory. **(3)** (b) Define atomic mass unit. Calculate the molecular mass of sulphuric acid, H_2SO_4. (H = 1 u, S = 32 u, O = 16 u) **(2) OR** (a) Define the terms atomic number, mass number and valency. **(3)** (b) An atom has 11 protons and 12 neutrons. Write its atomic number, mass number and electronic configuration. **(2)**

36. (a) Derive the equation v = u + at for uniformly accelerated motion. **(2)** (b) A bus starting from rest attains a velocity of 20 m/s in 10 seconds. Find its acceleration and the distance travelled in that time. **(3)**

SECTION E

3 case-based questions of 4 marks each

37. Case Study: A Leaking Water Tank

A school water tank is filled with a salt solution for a demonstration. A student places three potato slices of equal size into three beakers: Beaker A contains distilled water, Beaker B contains a solution of the same concentration as the potato cells, and Beaker C contains a concentrated salt solution. After two hours the slices are weighed again.

(i) In which beaker will the potato slice gain weight, and why? **(2)** (ii) Name the process responsible and define it. **(1)** (iii) What will happen to the slice in Beaker C? **(1) OR** (iii) What term describes the condition of the cells in Beaker B? **(1)**

38. Case Study: Separating a Mixture

A laboratory sample contains a mixture of common salt, sand and iron filings.

(i) Name the method used to separate iron filings from the mixture, and state the property it depends on. **(2)** (ii) How would you separate sand from the remaining mixture? **(1)** (iii) How would you finally recover pure salt from the salt solution? **(1) OR** (iii) Classify the original sample as a homogeneous or heterogeneous mixture, with a reason. **(1)**

39. Case Study: Earth as a System

The Earth's systems interact continuously. The atmosphere, hydrosphere, lithosphere and biosphere exchange matter and energy, and a change in one affects the others. For example, burning fossil fuels releases carbon dioxide into the atmosphere, which affects global temperature, which in turn affects the hydrosphere through melting ice and rising sea levels.

(i) Name the four major components of the Earth system mentioned above. **(2)** (ii) Give one example of an interaction between the atmosphere and the hydrosphere. **(1)** (iii) State one human activity that disturbs the balance of the Earth system, and one step to reduce its effect. **(1)**

MARKING SCHEME

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Marks are shown in brackets. Award full marks for any other scientifically correct answer.

SECTION A (20 × 1 = 20)

Q	Answer	Q	Answer
1	(b) cell	11	(a) $CaCO_3$
2	(c) mitochondrion	12	(b) 6.022×10^{23}
3	(c) hypertonic solution	13	(c) changing velocity
4	(c) xylem	14	(c) newton
5	(b) connective tissue	15	(b) every action has an equal and opposite reaction
6	(b) nerve cell	16	(c) 90°
7	(c) air	17	(d) vacuum
8	(b) fractional distillation	18	(b) 20 Hz to 20,000 Hz
9	(b) protons	19	(a)
10	(c) atomic number	20	(a)

SECTION B (6 × 2 = 12)

21. Any two correct differences, 1 mark each. For example: plant cells have a cell wall, animal cells do not; plant cells have plastids, animal cells do not; plant cells have a large central vacuole, animal cells have small or no vacuoles. **(2)**

22. Osmosis is the movement of solvent molecules from a region of lower solute concentration to a region of higher solute concentration through a semi-permeable membrane **(1)**; example, absorption of water by root hair cells **(1) OR** A hypotonic solution has a lower solute concentration than the cell **(1)**; an animal cell placed in it swells and may burst **(1)**

23. Any two differences, 1 mark each: a mixture has components in any proportion while a compound has a fixed proportion; components of a mixture keep their properties while a compound has new properties; a mixture can be separated physically while a compound needs a chemical change. Example of mixture, air; example of compound, water. **(2)**

24. Molar mass of H_2O = (2 × 1) + 16 **(1)** = 18 g/mol **(1)**

25. Total distance = 60 + 40 = 100 km; total time = 2 h **(1)** Average speed = 100/2 = 50 km/h **(1)**

26. An echo is heard when the reflected sound reaches the ear at least 0.1 s after the original sound, which needs a reflecting surface at least about 17 m away **(1)**; a small room has walls closer than this, so the reflected sound merges with the original **(1)**

SECTION C (7 × 3 = 21)

27. Correct diagram **(2)**; any six parts correctly labelled from cell wall, cell membrane, nucleus, cytoplasm, vacuole, chloroplast, mitochondria **(1)**

28. Striated or skeletal muscle, found in limbs **(1)**; smooth or unstriated muscle, found in the walls of the alimentary canal **(1)**; cardiac muscle, found in the heart **(1) OR** Xylem conducts water and minerals upward from roots to leaves, composed of tracheids, vessels, xylem parenchyma and xylem fibres **(1.5)** Phloem conducts food from leaves to other parts, composed of sieve tubes, companion cells, phloem parenchyma and phloem fibres **(1.5)**

29. Any three points of difference, 1 mark each. Particle size: solution smallest, colloid intermediate, suspension largest. Appearance: solution homogeneous and transparent, colloid appears homogeneous but is heterogeneous, suspension heterogeneous. Tyndall effect: not shown by solution, shown by colloid and suspension. Stability: solution and colloid stable, suspension settles on standing. **(3)**

30. Molar mass of CO_2 = 12 + (2 × 16) = 44 g/mol **(1)** Number of moles = given mass / molar mass = 22/44 **(1)** = 0.5 mol **(1)**

31. Newton's second law: the rate of change of momentum of a body is directly proportional to the applied force and takes place in the direction of the force **(1)** a = F/m = 20/4 = 5 m/s² **(1)** v = u + at = 0 + 5 × 5 = 25 m/s **(1)**

32. Work is said to be done when a force applied on a body produces displacement in the direction of the force; W = F × s **(1)** W = 15 × 4 **(1)** = 60 J **(1) OR** Power is the rate of doing work, P = W/t **(1)**; SI unit is the watt **(1)** P = 600/20 = 30 W **(1)**

33. Sound is produced by a vibrating body **(1)** The vibrating object pushes air particles together forming regions of high pressure called compressions, and apart forming regions of low pressure called rarefactions **(1)** These compressions and rarefactions travel outward as a longitudinal wave, carrying energy without the particles themselves travelling **(1)**

SECTION D (3 × 5 = 15)

34. (a) Correct animal cell diagram **(2)**; five parts correctly labelled **(1)** (b) Nucleus controls the activities of the cell and carries hereditary information **(1)**; the cell membrane is selectively permeable and controls the movement of substances in and out of the cell **(1) OR** (a) Tissues are groups of cells similar in structure and function working together **(1)**; flow chart showing plant tissues dividing into meristematic (apical, lateral, intercalary) and permanent (simple: parenchyma, collenchyma, sclerenchyma; complex: xylem, phloem) **(2)** (b) Meristematic tissue is responsible for growth in length and girth, and its cells divide actively **(2)**

35. (a) Any three postulates, 1 mark each: all matter is made of indivisible atoms; atoms of a given element are identical in mass and chemical properties; atoms of different elements have different masses and properties; atoms combine in small whole number ratios to form compounds; atoms cannot be created or destroyed in a chemical reaction. **(3)** (b) One atomic mass unit is one-twelfth the mass of a carbon-12 atom **(1)** Molecular mass of H_2SO_4 = (2 × 1) + 32 + (4 × 16) = 2 + 32 + 64 = 98 u **(1) OR** (a) Atomic number is the number of protons in the nucleus; mass number is the total number of protons and neutrons; valency is the combining capacity of an atom **(3)** (b) Atomic number = 11; mass number = 11 + 12 = 23 **(1)**; electronic configuration 2, 8, 1 **(1)**

36. (a) Acceleration $a = (v - u)/t$ **(1)**; rearranging gives $at = v - u$, hence $v = u + at$ **(1)** (b) $a = (v - u)/t = (20 - 0)/10 = 2$ m/s² **(1)** $s = ut + \frac{1}{2}at^2 = 0 + \frac{1}{2} \times 2 \times 100$ **(1)** = 100 m **(1)** Accept also $s = (u + v)t/2 = (0 + 20) \times 10/2 = 100$ m.

SECTION E (3 × 4 = 12)

37. (i) Beaker A, the distilled water **(1)**; it is hypotonic to the cell sap, so water enters the potato cells by osmosis and the slice gains weight **(1)** (ii) Osmosis, the movement of water across a semi-permeable membrane from lower to higher solute concentration **(1)** (iii) In Beaker C the solution is hypertonic, so water leaves the cells, the slice loses weight and becomes flaccid, showing plasmolysis **(1) OR** (iii) The cells in Beaker B are in an isotonic solution, so there is no net movement of water and the slice shows no change in weight **(1)**

38. (i) Magnetic separation, using a bar magnet **(1)**; it depends on iron being attracted to a magnet while salt and sand are not **(1)** (ii) Add water to dissolve the salt, then filter; sand remains on the filter paper as residue **(1)** (iii) Evaporate the filtrate, or use crystallisation, to recover pure salt **(1) OR** (iii) Heterogeneous, because the components are visible separately and the composition is not uniform throughout **(1)**

39. (i) Atmosphere, hydrosphere, lithosphere and biosphere **(2)**, half a mark each (ii) Any one valid example **(1)**: evaporation of water from oceans into the atmosphere; rainfall returning water from the atmosphere to the hydrosphere; warming of the atmosphere melting polar ice. (iii) Any one activity with a matching step **(1)**: burning fossil fuels, reduced by using renewable energy; deforestation, reduced by afforestation; industrial emissions, reduced by filtering and regulation.

End of marking scheme.