

CLASS 9 — SCIENCE SAMPLE PAPER

Physics & Chemistry — Full Syllabus Practice Paper

Time Allowed: 3 Hours

Maximum Marks: 80

General Instructions: (i) All questions are compulsory. (ii) The paper is divided into sections as marked. (iii) Read each question carefully before answering. (iv) Draw diagrams wherever necessary.

SECTION A — Physics (Very Short Answer, 1 mark each)

Answer in one word or one sentence.

1. Define uniform acceleration.
2. Write the three equations of motion.
3. State Newton's second law of motion and write its mathematical form.
4. Define momentum. State its SI unit.
5. State the law of conservation of momentum.
6. State Newton's universal law of gravitation.
7. Define acceleration due to gravity. What is its average value on Earth?
8. Differentiate between mass and weight.
9. State Archimedes' principle.
10. Define relative density.
11. Define work done by a force. State its SI unit.
12. State the law of conservation of energy.
13. Define power and state its SI unit.
14. What is 1 kWh expressed in joules?
15. Define wavelength, frequency, and amplitude of a sound wave.
16. What is the range of audible frequency for the human ear?

SECTION B — Physics (Short Answer, 2-3 marks each)

Show all steps of calculation clearly.

1. A car accelerates from rest at 2 m/s^2 for 5 seconds. Find the final velocity and distance covered.
2. Calculate the momentum of a body of mass 5 kg moving with a velocity of 10 m/s.
3. A ball of mass 0.5 kg is thrown vertically upward with a velocity of 20 m/s. Find the maximum height it reaches ($g = 10 \text{ m/s}^2$).
4. State and explain the universal law of gravitation with its formula.
5. Derive the relation between g and G (acceleration due to gravity and gravitational constant).
6. A body of mass 2 kg is lifted to a height of 5 m. Calculate the work done against gravity ($g = 9.8 \text{ m/s}^2$).
7. Calculate the kinetic energy of a body of mass 10 kg moving with a speed of 4 m/s.

8. Explain why a person feels lighter while swimming, using Archimedes' principle.
9. An object emits a sound of frequency 256 Hz. Calculate its time period.
10. Explain the difference between echo and reverberation.

SECTION C — Chemistry (Very Short Answer, 1 mark each)

Answer in one word or one sentence.

1. Name the three states of matter and state one characteristic of each.
2. Define latent heat of fusion.
3. Convert 25°C into Kelvin.
4. Define a pure substance.
5. Differentiate between homogeneous and heterogeneous mixtures.
6. Name two techniques used to separate the components of a mixture.
7. State the law of conservation of mass.
8. State the law of constant proportions.
9. Define atomic mass unit (amu).
10. What is Avogadro's number?
11. Define mole. How many particles are present in one mole of a substance?
12. Define atomic number and mass number.
13. What are isotopes? Give one example.
14. What are isobars? Give one example.
15. State the maximum number of electrons that can be accommodated in a shell (Bohr-Bury rule).

SECTION D — Chemistry (Short Answer, 2-3 marks each)

Show all steps of calculation clearly.

1. Explain the process of sublimation and give two examples of substances that sublime.
2. Calculate the number of moles present in 4.4 g of CO₂ (molar mass = 44 g/mol).
3. Explain the difference between evaporation and boiling.
4. Calculate the molecular mass of water (H₂O). [Atomic masses: H=1, O=16]
5. An atom has atomic number 11 and mass number 23. Find the number of protons, electrons, and neutrons.
6. Explain Rutherford's model of the atom and its limitations.
7. Differentiate between mixtures and compounds with two examples each.
8. State the postulates of Dalton's atomic theory.

SECTION E — Long Answer (5 marks each)

Answer in detail with diagrams and derivations where necessary.

1. Derive the three equations of motion ($v = u + at$, $s = ut + \frac{1}{2}at^2$, $v^2 = u^2 + 2as$) using the graphical method.

2. State Archimedes' principle and explain how it is used to determine whether an object will float or sink in a liquid, with examples.
3. Explain the law of conservation of energy with the example of a freely falling body, showing that total mechanical energy remains constant.
4. Describe Bohr's model of the atom and explain the distribution of electrons in different shells with an example (e.g., sodium).
5. Explain the process of separating the components of a mixture of common salt and water using evaporation and describe two other separation techniques used in daily life.