

CLASS 10 — 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. State the mirror formula and define magnification.
2. Define the power of a lens and state its SI unit.
3. State Snell's law of refraction.
4. Define refractive index of a medium.
5. What is the near point and far point of a normal human eye?
6. State Ohm's law.
7. Define resistivity of a conductor and state its SI unit.
8. Write the formula for equivalent resistance of resistors connected in series and in parallel.
9. Define electric power. Write its formula in three different forms.
10. State Joule's law of heating.
11. State Fleming's left-hand rule and its use.
12. State Fleming's right-hand rule and its use.
13. Differentiate between renewable and non-renewable sources of energy.

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

Show all steps of calculation clearly.

1. An object is placed 20 cm in front of a concave mirror of focal length 10 cm. Find the position of the image using the mirror formula.
2. A convex lens has a focal length of 25 cm. Calculate its power.
3. Three resistors of 2Ω , 3Ω , and 5Ω are connected in series. Calculate the equivalent resistance.
4. Calculate the resistance of a wire of length 2 m and area of cross-section 1 mm^2 if its resistivity is $1.6 \times 10^{-8} \Omega\text{m}$.
5. An electric bulb is rated 100 W, 220 V. Calculate the current drawn and the resistance of the filament.
6. Explain the working of an electric generator using Fleming's right-hand rule.
7. Draw the ray diagram for image formation by a convex lens when the object is placed beyond $2F$.
8. Calculate the electrical energy consumed by a 1000 W heater used for 3 hours, in kWh.

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

Answer in one word or one sentence.

1. Define a chemical reaction. Name the four main types of chemical reactions.
2. Define oxidation and reduction in terms of gain/loss of oxygen.
3. Write the balanced chemical equation for the reaction of zinc with dilute sulphuric acid.
4. Define pH. What is the pH range for acidic, neutral, and basic solutions?
5. Write the chemical formula of washing soda and baking soda.
6. Write the chemical formula of bleaching powder and Plaster of Paris.
7. Arrange the following metals in order of decreasing reactivity: Cu, K, Fe, Zn, Au.
8. Write the general equation for the reaction of a metal with a dilute acid.
9. Define an ionic compound. Give one example.
10. Write the general formula of alkanes, alkenes, and alkynes.
11. What is esterification? Write the general equation.
12. What is saponification?
13. State the Modern Periodic Law.
14. How many groups and periods are present in the Modern Periodic Table?

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

Write balanced chemical equations wherever required.

1. Balance the following chemical equation: $\text{Fe} + \text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$
2. Explain the difference between a combination reaction and a decomposition reaction with one example each.
3. Describe an activity to show that carbon dioxide gas is evolved when a metal carbonate reacts with an acid.
4. Explain why sodium and potassium are stored under kerosene oil.
5. Explain the formation of an ionic compound (e.g., NaCl) with electron dot diagrams.
6. Differentiate between saturated and unsaturated hydrocarbons with one example each.
7. Explain the trend of atomic size across a period and down a group in the periodic table.
8. Write short notes on the uses of washing soda and baking soda.

SECTION E — Long Answer (5 marks each)

Answer in detail with diagrams and derivations where necessary.

1. Derive the mirror formula ($1/v + 1/u = 1/f$) and explain image formation by a concave mirror for different object positions with ray diagrams.
2. State Ohm's law and describe an experiment to verify it. Derive the formula for equivalent resistance for resistors connected in series and parallel.
3. Explain the working principle, construction, and applications of an electric motor with a labelled diagram.

4. Explain the process of extraction of metals from their ores, describing the steps for metals of low, medium, and high reactivity.
5. Describe the modern periodic table, explaining the trends in atomic size, metallic character, and valency across a period and down a group with examples.