# NCERT Questions and Answers

## Chapter 1

### Q: Which of the statements about the reaction below are incorrect? 2PbO(s) + C(s) → 2Pb(s) + CO2(g) (a) Lead is getting reduced. (b) Carbon dioxide is getting oxidised. (c) Carbon is getting oxidised. (d) Lead oxide is getting reduced. (i) (a) and (b) (ii) (a) and (c) (iii) (a), (b) and (c) (iv) all

A: This question requires further review.

### Q: What happens when dilute hydrochloric acid is added to iron fillings? Tick the correct answer. (a) Hydrogen gas and iron chloride are produced. (b) Chlorine gas and iron hydroxide are produced. (c) No reaction takes place. (d) Iron salt and water are produced.

A: (a) Hydrogen gas and iron chloride are produced.

### Q: What is a balanced chemical equation? Why should chemical equations be balanced?

A: A balanced chemical equation has equal numbers of each atom type on both sides of the reaction. Chemical equations must be balanced to satisfy the law of conservation of mass, ensuring atoms are neither created nor destroyed during the reaction.

### Q: Translate the following statements into chemical equations and then balance them. (a) Hydrogen gas combines with nitrogen to form ammonia. (b) Hydrogen sulphide gas burns in air to give water and sulpur dioxide. (c) Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate. (d) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas.

A: (a) 3H₂ + N₂ → 2NH₃   
(b) 2H₂S + 3O₂ → 2H₂O + 2SO₂   
(c) 3BaCl₂ + Al₂(SO₄)₃ → 2AlCl₃ + 3BaSO₄   
(d) 2K + 2H₂O → 2KOH + H₂

### Q: Balance the following chemical equations. (a) HNO3 + Ca(OH)2 → Ca(NO3)2 + H2O (b) NaOH + H2SO4 → Na2SO4 + H2O (c) NaCl + AgNO3 → AgCl + NaNO3 (d) BaCl2 + H2SO4 → BaSO4 + HCl

A: (a) 2HNO₃ + Ca(OH)₂ → Ca(NO₃)₂ + 2H₂O   
(b) 2NaOH + H₂SO₄ → Na₂SO₄ + 2H₂O   
(c) NaCl + AgNO₃ → AgCl + NaNO₃   
(d) BaCl₂ + H₂SO₄ → BaSO₄ + 2HCl

### Q: Write the balanced chemical equations for the following reactions. (a) Calcium hydroxide + Carbon dioxide → Calcium carbonate + Water (b) Zinc + Silver nitrate → Zinc nitrate + Silver (c) Aluminium + Copper chloride → Aluminium chloride + Copper (d) Barium chloride + Potassium sulphate → Barium sulphate + Potassium chloride

A: (a) Ca(OH)₂ + CO₂ → CaCO₃ + H₂O   
(b) Zn + 2AgNO₃ → Zn(NO₃)₂ + 2Ag   
(c) 2Al + 3CuCl₂ → 2AlCl₃ + 3Cu   
(d) BaCl₂ + K₂SO₄ → BaSO₄ + 2KCl

### Q: Write the balanced chemical equation for the following and identify the type of reaction in each case. (a) Potassium bromide(aq) + Barium iodide(aq) → Potassium iodide(aq) + Barium bromide(s) (b) Zinc carbonate(s) → Zinc oxide(s) + Carbon dioxide(g) (c) Hydrogen(g) + Chlorine(g) → Hydrogen chloride(g) (d) Magnesium(s) + Hydrochloric acid(aq) → Magnesium chloride(aq) + Hydrogen(g)

A: (a) 2KBr(aq) + BaI₂(aq) → 2KI(aq) + BaBr₂(s); Double displacement.   
(b) ZnCO₃(s) → ZnO(s) + CO₂(g); Decomposition.   
(c) H₂(g) + Cl₂(g) → 2HCl(g); Combination.   
(d) Mg(s) + 2HCl(aq) → MgCl₂(aq) + H₂(g); Displacement.

### Q: What does one mean by exothermic and endothermic reactions? Give examples.

A: Exothermic reactions release heat energy to the surroundings, such as combustion (e.g., burning coal: C + O₂ → CO₂) or respiration. Endothermic reactions absorb heat energy from the surroundings, like the decomposition of calcium carbonate (e.g., CaCO₃ → CaO + CO₂ when heated).

### Q: Why is respiration considered an exothermic reaction? Explain.

A: Respiration breaks down glucose, releasing energy stored in chemical bonds. This energy is converted into ATP and heat, making the reaction exothermic due to the net release of thermal energy.

### Q: Write one equation each for decomposition reactions where energy is supplied in the form of heat, light or electricity.

A: Heat: CaCO₃(s) → CaO(s) + CO₂(g)   
Light: 2AgCl(s) → 2Ag(s) + Cl₂(g)   
Electricity: 2H₂O(l) → 2H₂(g) + O₂(g)

### Q: What is the difference between displacement and double displacement reactions? Write equations for these reactions.

A: Displacement reactions involve one element replacing another in a compound (e.g., Fe + CuSO₄ → FeSO₄ + Cu). Double displacement reactions involve the exchange of ions between two compounds (e.g., BaCl₂ + Na₂SO₄ → BaSO₄ + 2NaCl).

### Q: In the refining of silver, the recovery of silver from silver nitrate solution involved displacement by copper metal. Write down the reaction involved.

A: Cu + 2AgNO₃ → Cu(NO₃)₂ + 2Ag

### Q: What do you mean by a precipitation reaction? Explain by giving examples.

A: A precipitation reaction is a double displacement reaction where two aqueous solutions react to form an insoluble solid (precipitate). Examples include mixing barium chloride with sodium sulphate to produce barium sulphate precipitate (BaSO₄) and reacting silver nitrate with sodium chloride to form silver chloride precipitate (AgCl).

### Q: Explain the following in terms of gain or loss of oxygen with two examples each. (a) Oxidation (b) Reduction

A: (a) Oxidation is the gain of oxygen. Examples: Carbon forming CO₂ (C + O₂ → CO₂), magnesium forming MgO (2Mg + O₂ → 2MgO).   
(b) Reduction is the loss of oxygen. Examples: Copper oxide forming Cu (CuO + H₂ → Cu + H₂O), iron(III) oxide forming Fe (Fe₂O₃ + 3CO → 2Fe + 3CO₂).

### Q: A shiny brown coloured element ‘X’ on heating in air becomes black in colour. Name the element ‘X’ and the black coloured compound formed.

A: The element 'X' is copper (Cu). The black-colored compound formed is copper(II) oxide (CuO).

### Q: Why do we apply paint on iron articles?

A: Paint is applied on iron articles to prevent their exposure to moisture and oxygen, thereby avoiding oxidation (rusting) caused by chemical reactions with environmental elements. This protective coating acts as a barrier, inhibiting the formation of iron oxide.

### Q: Oil and fat containing food items are flushed with nitrogen. Why?

A: Oil and fat-containing food items are flushed with nitrogen to prevent oxidation and rancidity by displacing oxygen, which slows down the chemical reactions that cause spoilage. This inert environment helps maintain freshness and extends shelf life.

### Q: Explain the following terms with one example each. (a) Corrosion (b) Rancidity

A: (a) Corrosion: The deterioration of metals due to chemical reactions with environmental substances like oxygen or moisture; example: iron rusting (forming Fe₂O₃·xH₂O).   
(b) Rancidity: The oxidation of fats or oils in food, causing unpleasant odors or flavors; example: butter turning rancid when exposed to air.