

CBSE Class 10 Science Practice Bank

Chapter 1: Chemical Reactions and Equations

SECTION A: Objective Type Questions (1 Mark Each)

Multiple Choice Questions (Q1 - Q30)

- Which of the following is NOT a physical observation that helps determine if a chemical reaction has taken place?
(a) Change in state (b) Change in colour (c) Change in shape (d) Evolution of a gas
- What is the colour of the flame when a magnesium ribbon is burnt in the air?
(a) Blue (b) Dazzling white (c) Yellow (d) Green
- The chemical formula of the white powder formed on burning a magnesium ribbon is:
(a) $\text{Mg}(\text{OH})_2$ (b) MgCO_3 (c) MgO (d) MgSO_4
- Which gas is produced when dilute sulphuric acid is added to zinc granules?
(a) Oxygen (b) Hydrogen (c) Sulphur dioxide (d) Carbon dioxide
- A skeletal chemical equation is one that is:
(a) Balanced (b) Unbalanced (c) Showing only products (d) Showing only gaseous states
- In the chemical equation $3\text{Fe}(\text{s}) + 4\text{H}_2\text{O}(\text{g}) \rightarrow \text{Fe}_3\text{O}_4(\text{s}) + 4\text{H}_2(\text{g})$, the symbol (g) with water indicates that water is in the form of:
(a) Liquid (b) Ice (c) Steam (d) Aqueous solution
- The reaction $\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{Ca}(\text{OH})_2(\text{aq}) + \text{Heat}$ is an example of a:
(a) Displacement reaction (b) Combination reaction (c) Decomposition reaction (d) Double displacement reaction
- The common name for calcium oxide (CaO) is:
(a) Slaked lime (b) Limestone (c) Quick lime (d) Lime water
- Which of the following is an endothermic reaction?
(a) Burning of natural gas (b) Respiration (c) Decomposition of calcium carbonate (d) Reaction of water with quick lime
- The decomposition of vegetable matter into compost is an example of a/an:
(a) Endothermic reaction (b) Exothermic reaction (c) Displacement reaction (d) Double displacement reaction
- What is the colour of ferrous sulphate crystals?
(a) Blue (b) White (c) Green (d) Pale yellow

12. The characteristic odour observed on heating ferrous sulphate crystals is due to the formation of:
- (a) Iron oxide (b) Sulphur dioxide and sulphur trioxide (c) Hydrogen sulphide
(d) Oxygen gas.
13. Heating of limestone produces:
- (a) Quick lime and carbon dioxide (b) Slaked lime and oxygen (c) Calcium and carbon dioxide (d) Calcium hydroxide and water
14. The emission of brown fumes upon heating lead nitrate powder is due to which gas?
- (a) Nitric oxide (b) Nitrogen dioxide (c) Oxygen (d) Lead oxide.
15. In the electrolysis of water, the gas collected at the cathode is:
- (a) Oxygen (b) Hydrogen (c) Chlorine (d) Nitrogen
16. What happens when silver chloride is placed in sunlight?
- (a) It turns grey (b) It turns black (c) It turns yellow (d) It remains white
17. The reaction $2\text{AgBr(s)} \rightarrow 2\text{Ag(s)} + \text{Br}_2\text{(g)}$ is commercially used in:
- (a) Manufacture of cement (b) Whitewashing (c) Black and white photography (d) Rust prevention
18. When an iron nail is dipped in copper sulphate solution, the blue colour of the solution fades because:
- (a) Copper displaces iron (b) Iron displaces copper (c) Iron is oxidised by water (d) Copper sulphate evaporates
19. The insoluble substance formed during a double displacement reaction is known as a:
- (a) Solute (b) Solvent (c) Precipitate (d) Residue
20. Which of the following represents a double displacement reaction?
- (a) $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$ (b) $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$ (c) $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$ (d) $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
21. In the reaction $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$, the substance being reduced is:
- (a) CuO (b) H_2 (c) Cu (d) H_2O
22. Oxidation is defined as:
- (a) Gain of oxygen or loss of hydrogen (b) Loss of oxygen or gain of hydrogen (c) Gain of electrons (d) Loss of heat
23. Which of the following metals gets coated with a green layer upon corrosion?
- (a) Iron (b) Silver (c) Copper (d) Aluminium
24. The black coating on silver articles is an example of:
- (a) Rancidity (b) Corrosion (c) Displacement (d) Evaporation
25. Manufacturers flush bags of chips with nitrogen gas to prevent:
- (a) Corrosion (b) Rancidity (c) Breaking of chips (d) Moisture loss

26. Which of the following is NOT an exothermic reaction?
- (a) Digestion of food breaking down to glucose (b) Burning of coal (c) Heating of lead nitrate (d) Burning of natural gas
27. The law that is satisfied by balancing a chemical equation is the:
- (a) Law of multiple proportions (b) Law of conservation of mass (c) Law of definite proportions (d) Law of conservation of energy
28. The reaction $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$ is an example of a:
- (a) Redox reaction (b) Decomposition reaction (c) Combination reaction (d) Precipitation reaction
29. To equalise the number of atoms while balancing an equation, we can alter:
- (a) The chemical formula of the products (b) The chemical formula of the reactants (c) The coefficients of the compounds (d) The subscripts in the chemical formula
30. During the whitewashing of walls, a shiny finish appears after two to three days due to the formation of:
- (a) Calcium oxide (b) Calcium hydroxide (c) Calcium carbonate (d) Calcium sulphate

Assertion and Reason Type Questions

Directions: For the following questions, two statements are given—one labelled **Assertion (A)** and the other labelled **Reason (R)**. Select the correct answer from the codes (a), (b), (c), and (d) as given below: (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.

31. Assertion (A): The decomposition of vegetable matter into compost is an endothermic reaction. Reason (R): Decomposition reactions require energy to break down a single reactant.
32. Assertion (A): Chips manufacturers usually flush bags of chips with nitrogen gas. Reason (R): Nitrogen gas is an antioxidant that prevents the fats and oils in chips from getting oxidised.
33. Assertion (A): White silver chloride turns grey in sunlight. Reason (R): Silver chloride undergoes a combination reaction in the presence of sunlight.
34. Assertion (A): The reaction of calcium oxide with water is highly exothermic. Reason (R):
- a. A large amount of heat is evolved when quick lime reacts with water to form slaked lime.
35. Assertion (A): Rusting of iron is an example of corrosion. Reason (R): Iron is a noble metal and does not react with oxygen and moisture.

36. Assertion (A): Respiration is considered an exothermic reaction. Reason (R): Energy is released during the breakdown of glucose in our body cells.
37. Assertion (A): When copper powder is heated, it becomes coated with a black substance.
a. Reason (R): Copper reacts with oxygen to form copper(II) oxide.
38. Assertion (A): In the reaction $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$, CuO acts as an oxidising agent.
a. Reason (R): CuO loses oxygen to become Cu, hence undergoing reduction itself.
39. Assertion (A): Balancing a chemical equation is necessary. Reason (R): It satisfies the Law of Conservation of Mass.
40. Assertion (A): Heating lead nitrate produces brown fumes of nitrogen dioxide.
Reason (R): It is an example of an endothermic decomposition reaction.

SECTION B: Very Short Answer Questions (1 Mark Each)

41. What is a chemical reaction?
42. State one daily life example of a chemical change.
43. Why should a magnesium ribbon be cleaned before burning in air?
44. Write the chemical formula of rust.
45. Define a skeletal chemical equation.
46. Why must a chemical equation be balanced?
47. Name the type of reaction in which two or more reactants combine to form a single product.
48. Give an example of a combination reaction.
49. What is slaked lime chemically known as?
50. Write the balanced equation for the burning of natural gas (methane).
51. What are exothermic reactions?
52. Why is respiration considered an exothermic reaction?
53. What is a decomposition reaction?
54. Give an example of thermal decomposition.
55. Write the equation for the decomposition of calcium carbonate.

56. What is lime water?
57. What happens when carbon dioxide is passed through lime water?
58. What are the products of heating ferrous sulphate crystals?
59. Name the brown fumes evolved when lead nitrate is heated.
60. Which process is used for the decomposition of water?
61. Name the gases collected at the anode and cathode during water electrolysis.
62. Why is the volume of hydrogen collected double that of oxygen during the electrolysis of water?
63. Give an example of a photochemical decomposition reaction.
64. Where are photochemical reactions of silver chloride/bromide used?
65. Define a displacement reaction.
66. Why does the blue colour of copper sulphate fade when an iron nail is placed in it?
67. Write the balanced equation for the reaction between zinc and dilute hydrochloric acid.
68. What is a double displacement reaction?
69. Give an example of a precipitation reaction.
70. What is a precipitate?
71. Define oxidation in terms of oxygen.
72. Define reduction in terms of oxygen.
73. What is a redox reaction?
74. Identify the oxidised substance in: $2\text{Cu} + \text{O}_2 \rightarrow 2\text{CuO}$.
75. What is corrosion?
76. Give an example of corrosion other than the rusting of iron.
77. What is rancidity?
78. How can rancidity be prevented?
79. Why are food items packed in air-tight containers?
80. Name the inert gas used to flush potato chips packets.

SECTION C: Short Answer Questions (2-3 Marks Each)

81. Write the balanced chemical equations for the following reactions: (i) Calcium hydroxide + Carbon dioxide $\rightarrow$ Calcium carbonate + Water (ii) Zinc + Silver nitrate $\rightarrow$ Zinc nitrate + Silver
82. What happens when a piece of zinc metal is added to copper sulphate solution? Write the chemical equation.
83. Differentiate between an exothermic and an endothermic reaction with one example each. Why is photosynthesis considered an endothermic reaction?

84. A solution of a substance 'X' is used for whitewashing. (i) Name the substance 'X' and write
a. its formula. (ii) Write the reaction of the substance 'X' with water.
85. Explain what happens when ferrous sulphate crystals are heated. Write the equation and identify the type of reaction.
86. Explain the process of electrolysis of water with a chemical equation.
87. Why do we store silver chloride in dark-coloured bottles?
88. What is a displacement reaction? Explain with the help of an activity.
89. How is a double displacement reaction different from a displacement reaction?
90. What is a precipitation reaction? Explain by giving two examples.
91. Explain oxidation and reduction with an example of a redox reaction.
92. In the reaction: $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$ (i) Name the substance oxidised. (ii)
a. Name the substance reduced.
93. Why are bags of potato chips flushed with nitrogen gas?
94. What are antioxidants? Why are they added to fat and oil-containing foods?
95. State the physical signs that indicate a chemical reaction has occurred.
96. Balance the following chemical equations: (i) $\text{HNO}_3 + \text{Ca(OH)}_2 \rightarrow \text{Ca(NO}_3)_2 + \text{H}_2\text{O}$ (ii)
 $\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
97. Translate the following statements into balanced chemical equations: (i) Hydrogen gas combines with nitrogen to form ammonia. (ii) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.
98. Explain why rusting is a continuous process, whereas the green coating on copper protects it.
99. Identify the type of reactions in the following: (i) $2\text{H}_2\text{O(l)} \rightarrow 2\text{H}_2\text{(g)} + \text{O}_2\text{(g)}$ (ii) $2\text{KClO}_3\text{(s)} \rightarrow 2\text{KCl(s)} + 3\text{O}_2\text{(g)}$
100. Write the chemical equation for the reaction of iron with steam. What is the state of the iron oxide formed?
101. Explain the term 'corrosion' with two examples.
102. Explain the term 'rancidity' and mention two ways to prevent it.
103. Why is the decomposition of silver bromide used in black and white photography?
104. Why does a magnesium ribbon burn with a dazzling white flame?
105. A shiny brown coloured element 'X' on heating in air becomes black in colour. Name the element 'X' and the black coloured compound formed.
106. Why do we apply paint on iron articles?
107. What is the difference between combination and decomposition reactions?
108. When barium chloride solution is mixed with sodium sulphate solution, a white precipitate is formed. Write the balanced equation and name the precipitate.
109. How is a skeletal equation different from a balanced equation?
110. Identify the reducing agent in the following reaction: $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$

111. Write an equation each for decomposition reactions where energy is supplied in the form of heat, light, or electricity.
112. What happens when dilute hydrochloric acid is added to iron fillings? Tick the correct answer and justify.
- (a) Hydrogen gas and iron chloride are produced. (b) Chlorine gas and iron hydroxide are produced.
113. Can we stir silver nitrate solution with a copper spoon? Why or why not?
114. Write the balanced equation for: Barium chloride + Potassium sulphate $\rightarrow$ Barium sulphate + Potassium chloride.

SECTION D: Long Answer Questions / Case-Based (5 Marks Each)

115. Explain the four major types of chemical reactions with the help of one balanced chemical equation for each.
116. (a) Define a redox reaction. (b) Identify the substances that are oxidised and the substances that are reduced in the following reactions: (i) $4\text{Na(s)} + \text{O}_2\text{(g)} \rightarrow 2\text{Na}_2\text{O(s)}$ (ii) $\text{CuO(s)} + \text{H}_2\text{(g)} \rightarrow \text{Cu(s)} + \text{H}_2\text{O(l)}$ (iii) $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$
117. Describe an activity to show that a displacement reaction takes place between an iron nail
118. and copper sulphate solution. Include the observations and the chemical equation.
119. (a) What is rancidity? (b) Mention three methods to prevent rancidity of food items containing fats and oils. (c) Why do we keep food items in airtight containers?
120. (a) What is a precipitation reaction? (b) Write a balanced chemical equation for the reaction between lead nitrate and potassium iodide. (c) State the colour of the precipitate formed.
121. Translate the following reactions into balanced chemical equations: (a) Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate. (b) Potassium metal reacts with water to give potassium hydroxide and hydrogen gas. (c) Calcium oxide reacts with water to give calcium hydroxide.
122. A metal 'M' reacts with an acid 'A' to evolve a gas 'G' which burns with a pop sound. (a) Identify the gas 'G'. (b) If 'M' is Zinc and 'A' is sulphuric acid, write the balanced chemical equation. (c) How will you test for the presence of gas 'G'?
123. Explain the term 'Corrosion'. List three factors that promote corrosion. Write three methods by which rusting of iron can be prevented.
124. (a) Why is the amount of gas collected in one of the test tubes in the electrolysis of water double the amount collected in the other? (b) Name this gas. (c) Write the chemical equation for the electrolysis of water.

125. Case Study: Rita observed that when she left an apple slice on the kitchen counter, it
- turned brown after some time. Similarly, she noticed that an old iron gate in her garden had
 - developed a reddish-brown flaky coating.
- (a) Name the chemical process responsible for both observations. (b) What is the specific term used for this process when it occurs on metals? (c) Write the chemical equation for the formation of rust.
126. Discuss the thermal decomposition of lead nitrate. Give the balanced chemical equation, observations, and the name of the gas that produces brown fumes.
127. Balance the following equations and identify the type of reaction in each case:
(a) $\text{KBr(aq)} + \text{BaI}_2(\text{aq}) \rightarrow \text{KI(aq)} + \text{BaBr}_2(\text{s})$ (b) $\text{ZnCO}_3(\text{s}) \rightarrow \text{ZnO(s)} + \text{CO}_2(\text{g})$ (c) $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \rightarrow 2\text{HCl(g)}$
128. (a) What is meant by a skeletal chemical equation? (b) What does the symbol (aq) represent in a chemical equation? (c) Why is it necessary to balance a chemical equation? Explain with reference to the Law of Conservation of Mass.
129. (a) Describe an activity to demonstrate an exothermic reaction. (b) Describe an activity to demonstrate an endothermic reaction. (c) Provide chemical equations for both activities.
130. Compare and contrast: (a) Combination reaction vs Decomposition reaction. (b) Displacement reaction vs Double displacement reaction.