

1.1 Chemical Equations

MCQ

- Sodium reacts with water to form sodium hydroxide and hydrogen gas. The balanced equation which represents the above reaction is
 - $\text{Na}_{(s)} + 2\text{H}_2\text{O}_{(l)} \rightarrow 2\text{NaOH}_{(aq)} + 2\text{H}_{2(g)}$
 - $2\text{Na}_{(s)} + 2\text{H}_2\text{O}_{(l)} \rightarrow 2\text{NaOH}_{(aq)} + \text{H}_{2(g)}$
 - $2\text{Na}_{(s)} + 2\text{H}_2\text{O}_{(l)} \rightarrow \text{NaOH}_{(aq)} + 2\text{H}_{2(g)}$
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 (Term I, 2021-22) **Ap**
- It is important to balance the chemical equations to satisfy the law of conservation of mass. Which of the following statements of the law is incorrect?
 - The total mass of the elements present in the reactants is equal to the total mass of the elements present in the products.
 - The number of atoms of each element remains the same, before and after a chemical reaction.
 - The chemical composition of the reactants is the same before and after the reaction.
 - Mass can neither be created nor can it be destroyed in a chemical reaction.
 (Term I, 2021-22) **U**
- Identify 'x', 'y' and 'z' in the following reaction :

$$2\text{KClO}_{3(x)} \xrightarrow{y} 2\text{KCl}_{(x)} + \text{O}_{2(z)}$$
 - x = gas; y = reaction condition; z = gas
 - x = solid; y = liquid; z = gas
 - x = number of moles of KClO_3 ; y = reaction condition; z = number of molecules of oxygen
 - x = physical state of KClO_3 and KCl ; y = reaction condition, z = physical state of O_2 . (2020)
- Assertion (A) :** Following is a balanced chemical equation for the action of steam on iron :

$$3\text{Fe} + 4\text{H}_2\text{O} \longrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$$
Reason (R) : The law of conservation of mass holds good for a chemical equation.
 - Both (A) and (R) are true and reason (R) is the correct explanation of the assertion (A).
 - Both (A) and (R) are true, but reason (R) is not the correct explanation of the assertion (A).
 - (A) is true, but (R) is false.
 - (A) is false, but (R) is true. (2020)

SA I (2 marks)

- State the law that is followed by balancing a chemical equation.
 - Balance the following chemical equation :

$$\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$$
 (Board Term I, 2013)

SA II (3 marks)

- Explain the significance of photosynthesis. Write the balanced chemical equation involved in the process. (Board Term I, 2017) **U**
- Write balanced chemical equations for the following chemical reactions :
 - Hydrogen + Chlorine \rightarrow Hydrogen chloride (NCERT Intext)
 - Lead + Copper chloride \rightarrow Lead chloride + Copper
 - Zinc oxide + Carbon \rightarrow Zinc + Carbon monoxide (Board Term I, 2014)

1.2 Types of Chemical Reactions

MCQ

- A student took sodium sulphate solution in a test tube and added barium chloride solution to it. He observed that an insoluble substance has formed. The colour and molecular formula of the insoluble substance is
 - grey, Ba_2SO_4
 - yellow, $\text{Ba}(\text{SO}_4)_2$
 - white, BaSO_4
 - pink, BaSO_4
 (Term I, 2021-22) **An**
- $$\text{C}_6\text{H}_{12}\text{O}_6(aq) + 6\text{O}_{2(g)} \rightarrow 6\text{CO}_{2(g)} + 6\text{H}_2\text{O}_{(l)}$$
 The above reaction is a/an
 - displacement reaction
 - endothermic reaction
 - exothermic reaction
 - neutralisation reaction. (Term I, 2021-22) **U**
- Which of the following statement about the reaction given below are correct?

$$\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$$
 - HCl is oxidized to Cl_2 .
 - MnO_2 is reduced to MnCl_2 .
 - MnCl_2 acts as an oxidizing agent.
 - HCl acts as an oxidizing agent.
 - (ii), (iii) and (iv)
 - (i), (ii) and (iii)
 - (i) and (ii) only
 - (iii) and (iv) only
 (Term I, 2021-22)
- Which one of the following reactions is categorised as thermal decomposition reaction?
 - $2\text{H}_2\text{O}_{(l)} \rightarrow 2\text{H}_{2(g)} + \text{O}_{2(g)}$
 - $2\text{AgBr}_{(s)} \rightarrow 2\text{Ag}_{(s)} + \text{Br}_{2(g)}$
 - $2\text{AgCl}_{(s)} \rightarrow 2\text{Ag}_{(s)} + \text{Cl}_{2(g)}$
 - $\text{CaCO}_{3(s)} \rightarrow \text{CaO}_{(s)} + \text{CO}_{2(g)}$ (Term I, 2021-22) **An**
- Assertion (A) :** Burning of natural gas is an endothermic process.
 Reason (R) : Methane gas combines with oxygen to produce carbon dioxide and water.

- (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. (Term I, 2021-22)

13. Consider the following processes

- I. Dilution of sulphuric acid
 II. Sublimation of dry ice
 III. Condensation of water vapours
 IV. Dissolution of ammonium chloride in water

The endothermic process(es) is/are

- (a) I and III (b) II only (c) III only (d) II and IV

(Term I, 2021-22) (An)

14. When lead nitrate powder is heated in boiling tube, we observe

- (a) brown fumes of nitrogen dioxide
 (b) brown fumes of lead oxide
 (c) yellow fumes of nitrogen dioxide
 (d) brown fumes of nitric oxide.

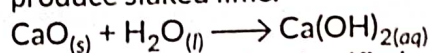
(Term I, 2021-22) (R)

15. Assertion (A) : Silver salts are used in black and white photography.

Reason (R) : Silver salts do not decompose in the presence of light.

- (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. (Term I, 2021-22)

16. Calcium oxide reacts vigorously with water to produce slaked lime.



This reaction can be classified as

- (A) Combination reaction
 (B) Exothermic reaction
 (C) Endothermic reaction
 (D) Oxidation reaction

Which of the following is a correct option?

- (a) (A) and (C) (b) (C) and (D)
 (c) (A), (C) and (D) (d) (A) and (B) (2020) (U)

17. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of a

- (a) combination reaction
 (b) displacement reaction
 (c) decomposition reaction
 (d) double displacement reaction. (2020)

18. In a double displacement reaction such as the reaction between sodium sulphate solution and barium chloride solution :

- (A) exchange of atoms takes place
 (B) exchange of ions takes place
 (C) a precipitate is produced
 (D) an insoluble salt is produced

The correct option is

- (a) (B) and (D) (b) (A) and (C)
 (c) only (B) (d) (B), (C) and (D)

(2020) (An)

19. In which of the following, the identity of initial substance remains unchanged?

- (a) Curdling of milk
 (b) Formation of crystals by process of crystallisation
 (c) Fermentation of grapes
 (d) Digestion of food (2020)

SA I (2 marks)

20. Study the following equation of a chemical reaction :
 $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$

- (i) Identify the type of reaction.
 (ii) Write a balanced chemical equation of another example of this type of reaction.

(Board Term I, 2015)

21. State the type of chemical reactions, represented by the following equations :

- (a) $\text{A} + \text{BC} \rightarrow \text{AC} + \text{B}$
 (b) $\text{A} + \text{B} \rightarrow \text{C}$
 (c) $\text{PQ} + \text{RS} \rightarrow \text{PS} + \text{RQ}$
 (d) $\text{A}_2\text{O}_3 + 2\text{B} \rightarrow \text{B}_2\text{O}_3 + 2\text{A}$ (Board Term I, 2014) (An)

SA II (3 marks)

22. 1 g of copper powder was taken in a China dish and heated. What change takes place on heating? When hydrogen gas is passed over this heated substance, a visible change is seen in it. Give the chemical equations of reactions, the name and the colour of the products formed in each case. (2020)

23. A compound 'A' is used in the manufacture of cement. When dissolved in water, it evolves a large amount of heat and forms compound 'B'.

- (i) Identify A and B.
 (ii) Write chemical equation for the reaction of A with water.
 (iii) List two types of reaction in which this reaction may be classified. (2020)

24. Identify the type of each of the following reactions. Also write balanced chemical equation for each reaction.

- (i) A reaction in which the reaction mixture becomes warm.
 (ii) A reaction in which an insoluble substance is formed. (2020)

25. Lead nitrate solution is added to a test tube containing potassium iodide solution.

- (a) Write the name and colour of the compound precipitated.
- (b) Write the balanced chemical equation for the reaction involved.
- (c) Name the type of this reaction justifying your answer. (2020)
- 26.** 2 g of silver chloride is taken in a China dish and the China dish is placed in sunlight for sometime. What will be your observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction. (Delhi 2019)
- 27.** Identify the type of reactions taking place in each of the following cases and write the balanced chemical equation for the reactions.
- (a) Zinc reacts with silver nitrate to produce zinc nitrate and silver.
- (b) Potassium iodide reacts with lead nitrate to produce potassium nitrate and lead iodide. (Delhi 2019) **Ap**
- 28.** 2 g of ferrous sulphate crystals are heated in a dry boiling tube.
- (a) List any two observations.
- (b) Name the type of chemical reaction taking place.
- (c) Write balanced chemical equation for the reaction and name the products formed. (AI 2019, Board Term I, 2017, 2016)
- 29.** You might have noted that when copper powder is heated in a China dish, the reddish brown surface of copper powder becomes coated with a black substance.
- (a) Why has this black substance formed?
- (b) What is the black substance?
- (c) Write the chemical equation of the reaction that takes place.
- (d) How can the black coating on the surface be turned reddish brown? (AI 2019)
- 30.** Decomposition reactions require energy either in the form of heat or light or electricity for breaking down the reactants. Write one equation each for decomposition reactions where energy is supplied in the form of heat, light and electricity. (2018) **U**
- 31.** Take 3 g of barium hydroxide in a test tube, now add about 2 g of ammonium chloride and mix the contents with the help of a glass rod. Now touch the test tube from outside.
- (i) What do you feel on touching the test tube?
- (ii) State the inference about the type of reaction occurred.
- (iii) Write the balanced chemical equation of the reaction involved. (Board Term I, 2017)
- 32.** (a) A solution of potassium chloride when mixed with silver nitrate solution, an insoluble white substance is formed. Write the chemical

reaction involved and also mention the type of the chemical reaction. (NCERT Exemplar)

- (b) Ferrous sulphate when heated, decomposes with the evolution of a gas having a characteristic odour of burning sulphur. Write the chemical reaction involved and identify the type of reaction. (Board Term I, 2016) **Cr**
- 33.** Name the type of chemical reaction represented by the following equation:
- (i) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$
- (ii) $3\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \rightarrow 2\text{AlCl}_3 + 3\text{BaSO}_4$
- (iii) $2\text{FeSO}_4 \xrightarrow{\text{Heat}} \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$ (Board Term I, 2016) **An**
- 34.** What is a reduction reaction? Identify the substances that are oxidised and the substances that are reduced in the following reactions.
- (a) $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$
- (b) $2\text{PbO} + \text{C} \rightarrow 2\text{Pb} + \text{CO}_2$ (Board Term I, 2015)
- LA (5 marks)**
- 35.** (a) Can a displacement reaction be a redox reaction? Explain with the help of an example.
- (b) Write the type of chemical reaction in the following:
- (i) Reaction between an acid and a base
- (ii) Rusting of iron. (Board Term I, 2017)
- 36.** Mention the type of chemical reaction that takes place when:
- (i) a magnesium ribbon is burnt in air.
- (ii) limestone is heated.
- (iii) silver bromide is exposed to sunlight.
- (iv) electricity is passed through acidified water.
- (v) ammonia and hydrogen chloride are mixed with each other.
- Write the chemical equation for each reaction. (Board Term I, 2013) **U**

1.3 Have You Observed the Effects of Oxidation Reactions in Every-day Life?

SA II (3 marks)

- 37.** What happens when food materials containing fats and oils are left for a long time? List two observable changes and suggest three ways by which this phenomenon can be prevented. (2020) **U**
- 38.** (i) Why is respiration considered as an exothermic reaction? (NCERT)
- (ii) Write chemical name and the formula of the brown gas produced during thermal decomposition of lead nitrate.
- (iii) Why do chips manufacturers flush bags of chips with gas such as nitrogen? (Board Term I, 2015)