

CHAPTER 1

ANSWERS

Multiple Choice Questions

1. (d) 2. (c)
3. (c) **Hint**— The substance which oxidises the other substances in a chemical reaction is known as an oxidising agent. Likewise, the substance which reduces the other substance in a chemical reaction is known as reducing agent.
4. (a) 5. (c) 6. (a) 7. (b)
8. (a) 9. (b) 10. (d) 11. (b)
12. (d)
13. (b) **Hint**— Lead sulphate being insoluble will not dissociate into Pb^{2+} ions.
14. (d) 15. (a) 16. (d) 17. (d)
18. (d)

Short Answer Questions

19. (a) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \xrightarrow[773 \text{ K}]{\text{Catalyst}} 2\text{NH}_3(\text{g})$
Combination reaction
- (b) $\text{NaOH}(\text{aq}) + \text{CH}_3\text{COOH}(\text{aq}) \longrightarrow \text{CH}_3\text{COONa}(\text{aq}) + \text{H}_2\text{O}(\text{l})$
Double displacement reaction/Neutralisation reaction
- (c) $\text{C}_2\text{H}_5\text{OH}(\text{l}) + \text{CH}_3\text{COOH}(\text{l}) \xrightarrow{\text{H}^+} \text{CH}_3\text{COOC}_2\text{H}_5(\text{l}) + \text{H}_2\text{O}(\text{l})$
Double displacement reaction/Esterification reaction
- (d) $\text{C}_2\text{H}_4(\text{g}) + 3\text{O}_2(\text{g}) \longrightarrow 2\text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g}) + \text{Heat} + \text{Light}$
Redox reaction/Combustion reaction

20. (a) $\text{Fe}_2\text{O}_3(\text{s}) + 2\text{Al}(\text{s}) \longrightarrow \text{Al}_2\text{O}_3(\text{s}) + 2\text{Fe}(\text{l}) + \text{Heat}$
Displacement reaction/Redox reaction

(b) $3\text{Mg}(\text{s}) + \text{N}_2(\text{g}) \longrightarrow \text{Mg}_3\text{N}_2(\text{s})$
Combination reaction

(c) $2\text{KI}(\text{aq}) + \text{Cl}_2(\text{g}) \longrightarrow 2\text{KCl}(\text{aq}) + \text{I}_2(\text{s})$
Displacement reaction

(d) $\text{C}_2\text{H}_5\text{OH}(\text{l}) + 3\text{O}_2(\text{g}) \longrightarrow 2\text{CO}_2(\text{g}) + 3\text{H}_2\text{O}(\text{l}) + \text{Heat}$
Redox reaction/Combustion reaction

21. (a) $\mathbf{x} \longrightarrow (\text{s})$
 $\mathbf{y} \longrightarrow (\text{aq})$
(b) $\mathbf{x} \longrightarrow 2 \text{Ag}$
(c) $\mathbf{x} \longrightarrow (\text{aq})$
 $\mathbf{y} \longrightarrow (\text{g})$
(d) $\mathbf{x} \longrightarrow \text{Heat}$

22. (b) and (c) are exothermic as heat is released in these changes.
(a) and (d) are endothermic as heat is absorbed in these changes

23. (a) Ammonia (NH_3)

(b) Water (H_2O) as F_2 is getting reduced to HF

(c) Carbon monoxide (CO)

(d) Hydrogen

Hint—Reducing agents are those substances which have the ability of adding hydrogen or removing oxygen from the other substances.

24. (a) Pb_3O_4
(b) O_2
(c) CuSO_4
(d) V_2O_5
(e) H_2O
(f) CuO

25. (a) $\text{Na}_2\text{CO}_3 + \text{HCl} \longrightarrow \text{NaCl} + \text{NaHCO}_3$
(b) $\text{NaHCO}_3 + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$
(c) $2\text{CuSO}_4 + 4\text{KI} \longrightarrow \text{Cu}_2\text{I}_2 + 2\text{K}_2\text{SO}_4 + \text{I}_2$

26. $\text{KCl}(\text{aq}) + \text{AgNO}_3(\text{aq}) \longrightarrow \text{AgCl}(\text{s}) + \text{KNO}_3(\text{aq})$

It is a double displacement and precipitation reaction.

27. $2\text{FeSO}_4(\text{s}) \xrightarrow{\text{Heat}} \text{Fe}_2\text{O}_3(\text{s}) + \text{SO}_2(\text{g}) + \text{SO}_3(\text{g})$

It is a thermal decomposition reaction

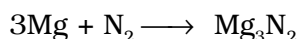
- 28.** Fire flies have a protein which in the presence of an enzyme undergoes aerial oxidation. This is a chemical reaction which involves emission of visible light. Therefore, fire flies glow at night.
- 29.** Grapes when attached to the plants are living and therefore their own immune system prevents fermentation. The microbes can grow in the plucked grapes and under anaerobic conditions these can be fermented. This is a chemical change.
- 30.** (a), (c) and (e) — are physical changes.
(b) and (d) are chemical changes
- 31. Hint—** (a) Silver metal does not react with dilute HCl
(b) The temperature of the reaction mixture rises when aluminium is added because it is an exothermic reaction.
(c) Reaction of sodium metal is found to be highly explosive because it is an exothermic reaction
(d) When lead is treated with hydrochloric acid, bubbles of hydrogen gas are evolved

$$\text{Pb} + 2\text{HCl} \rightarrow \text{PbCl}_2 + \text{H}_2$$
- 32.** Calcium oxide

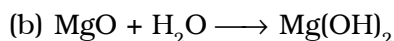
$$\text{CaO(s)} + \text{H}_2\text{O(l)} \longrightarrow \text{Ca(OH)}_2\text{(aq)}$$
- 33.** (a) $\text{Pb(CH}_3\text{COO)}_2 + 2\text{HCl} \longrightarrow \text{PbCl}_2 + \text{CH}_3\text{COOH}$; Double displacement reaction
(b) $2\text{Na} + 2\text{C}_2\text{H}_5\text{OH} \longrightarrow 2\text{C}_2\text{H}_5\text{ONa} + \text{H}_2$; Displacement reaction
(c) $\text{Fe}_2\text{O}_3 + 3\text{CO} \longrightarrow 2\text{Fe} + 3\text{CO}_2$; Redox reaction
(d) $2\text{H}_2\text{S} + \text{O}_2 \longrightarrow 2\text{S} + 2\text{H}_2\text{O}$; Redox reaction
- 34.** Silver chloride on exposure to sunlight may decompose as per the following reaction.

$$2\text{AgCl} \longrightarrow 2\text{Ag} + \text{Cl}_2$$

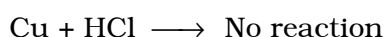
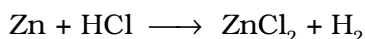
 Therefore, it is stored in dark coloured bottles.
- 35.** (a) Balanced; Combination reaction
(b) $2\text{HgO (s)} \xrightarrow{\text{Heat}} 2\text{Hg (l)} + \text{O}_2 \text{ (g)}$; Decomposition reaction
(c) $2\text{Na (s)} + \text{S (s)} \xrightarrow{\text{Fuse}} \text{Na}_2\text{S (s)}$; Combination reaction
(d) $\text{TiCl}_4 \text{ (l)} + 2\text{Mg (s)} \longrightarrow \text{Ti (s)} + 2\text{MgCl}_2 \text{ (s)}$; Displacement reaction
(e) Balanced; Combination reaction
(f) $2\text{H}_2\text{O}_2 \text{ (l)} \xrightarrow{\text{UV}} 2\text{H}_2\text{O (l)} + \text{O}_2 \text{ (g)}$; Decomposition reaction



(a) X is MgO; Y is Mg_3N_2



37. Zinc is above hydrogen whereas copper is below hydrogen in the activity series of metals. That is why zinc displaces hydrogen from dilute hydrochloric acid, while copper does not.

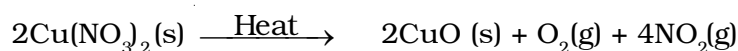


38. (a) Metals such as silver when attacked by substances around it such as moisture, acids, gases etc, are said to corrode and this phenomenon is called corrosion.

(b) The black substance is formed because silver (Ag) reacts with H_2S present in air. It forms thin black coating of silver sulphide (Ag_2S).

Long Answer Questions

39. (a) Balanced chemical equation



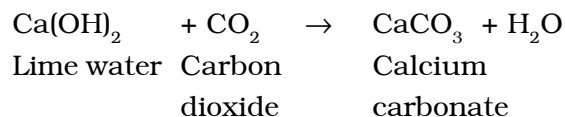
(b) The brown gas X evolved is nitrogen dioxide (NO_2)

(c) This is a decomposition reaction

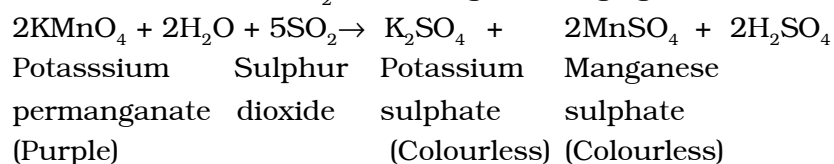
(d) Nitrogen dioxide dissolves in water to form acidic solution because it is an oxide of non-metal. Therefore, pH of this solution is less than 7

40. The characteristic test for

(a) Carbon dioxide (CO_2) gas turns lime water milky when passed through it due to the formation of insoluble calcium carbonate.



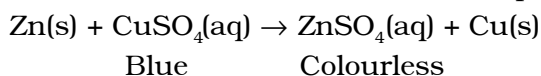
(b) Sulphur dioxide (SO_2) gas when passed through acidic potassium permanganate solution (purple in colour) turns it colourless because SO_2 is a strong reducing agent



or

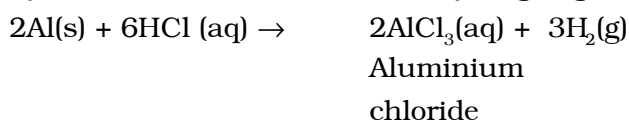
Sulphur dioxide gas when passed through acidic dichromate solution (orange in colour) turns it to green because sulphur dioxide is a strong reducing agent.

- (c) The evolution of oxygen (O₂) gas during a reaction can be confirmed by bringing a burning candle near the mouth of the test tube containing the reaction mixture. The intensity of the flame increases because oxygen supports burning.
- (d) Hydrogen (H₂) gas burns with a pop sound when a burning candle is brought near it.
- 41.** (a) Zinc being more reactive than copper displaces copper from its solution and a solution of zinc sulphate is obtained

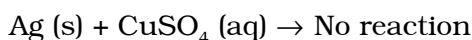


This is an example of displacement reaction

- (b) Aluminium being more reactive displaces hydrogen from dilute hydrochloric acid solution and hydrogen gas is evolved.

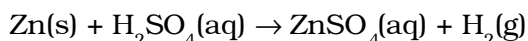


- (c) Silver metal being less reactive than copper cannot displace copper from its salt solution. Therefore, no reaction occurs

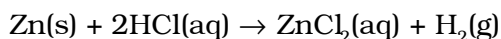


- 42.** The reaction of Zn granules with

- (a) Dilute H₂SO₄

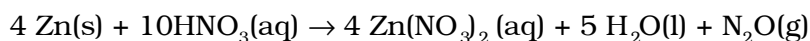


- (b) Dilute HCl

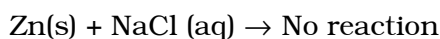


- (c) Dilute HNO₃

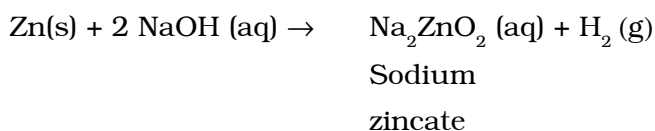
Reaction with dilute HNO₃ is different as compared to other acids because nitric acid is an oxidising agent and it oxidises H₂ gas evolved to H₂O.



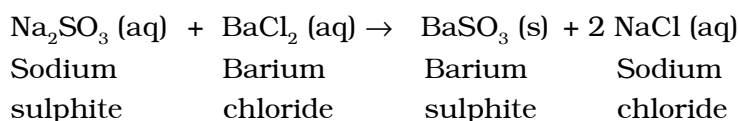
- (d) NaCl solution



- (e) NaOH solution



43. (a) Balanced chemical equation



(b) This reaction is also known as double displacement reaction

(c) BaSO_3 is a salt of a weak acid (H_2SO_3), therefore dilute acid such as HCl decomposes barium sulphite to produce sulphur dioxide gas which has the smell of burning sulphur.



White ppt.

BaCl_2 is soluble in water, hence white precipitate disappears

44. (A) When solutions are kept in copper container

(a) Dilute HCl

Copper does not react with dilute HCl. Therefore, it can be kept.

(b) Dilute HNO_3

Nitric acid acts as a strong oxidising agent and reacts with copper vessel, therefore cannot be kept.

(c) ZnCl_2

Zinc is more reactive than copper (Cu) therefore, no displacement reaction occurs and hence can be kept.

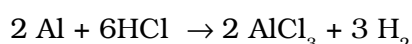
(d) H_2O

Copper does not react with water. Therefore, can be kept.

(B) When solutions are kept in aluminium containers

(a) Dilute HCl

Aluminium reacts with dilute HCl to form its salt and hydrogen is evolved. Therefore, cannot be kept.

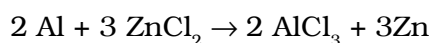


(b) Dilute HNO_3

Aluminium gets oxidised by dilute HNO_3 to form a layer of Al_2O_3 and can be kept.

(c) ZnCl_2

Aluminium being more reactive than zinc can displace zinc ion from the solution. Therefore, the solution cannot be kept.



(d) H_2O

Aluminium does not react with cold or hot water. Therefore, water can be kept.

Aluminium is attacked by steam to form aluminium oxide and hydrogen

