Chemical Reactions and Equations Chapter Wise Important Questions Class 10 Science

1.“We need to balance a skeletal chemical equation.” Give reason to justify the statement.

Answer. Skeletal chemical equation are unbalanced. We need to balance chemical equation because of law of conservation of mass. It states that ‘matter can neither be created nor be destroyed’. Therefore chemical equation must be balanced in each and every chemical reaction.

2.Giving an example list two information which make a chemical equation more useful (informative).

Answer.

(i) Physical state of reactants must be mentioned, e.g.

$2H_2$ (g) + O_2 (g)———– > $2H_20$ (l)

(ii) Condition in which reaction takes place are written on the arrow head, e.g.

$$2H_2\ (g) + O_2\ (g) \xrightarrow{\text{burning}} 2H_2O\ (l)$$

Consider the following chemical reaction

X + Barium chloride———–> Y + Sodium chloride

(White ppt)

(a) Identify ‘X’ and ‘Y’

(b) The type of reaction

(a) ‘X’ is $Na2SO_4$ and Y is $BaSO_4$.

(b) The type of reaction

Na_2SO_4 + $BaCl_2$—–> $BaSO_4$ + 2NaCl

(White ppt)

The reaction is precipitation reaction. It is also called double displacement reaction.

3. Name the reducing agent in the following reaction:

$3MnO_2$ + 4Al———— > 3Mn + $2Al_2O_3$

State which is more reactive, Mn or Al and why?

Answer. ‘Al’ is reducing agent.

‘Al is more reactive than Mn ‘Al’ displaces Mn from its oxide.

4.(i) Write a balanced chemical equation for the process of photosynthesis.
(ii)When do desert plants take up carbon dioxide and perform photosynthesis?

Answer.

$$(i)\ 6CO_2\ (g) + 6H_2O\ (l) \xrightarrow{\text{Sunlight}} C_6H_{12}O_6\ (s) + 6O_2(g)$$

(ii) In desert plants the stomata are open at night. They take CO_2 at night and is stored in the form of acid and is used during day time for photosynthesis.

5.A Name the type of chemical reaction represented by the following equation:

$$(i)\ CaO + H_2O \longrightarrow Ca(OH)_2$$

$$(ii)\ 3BaCl_2 + Al_2(SO_4)_3 \longrightarrow 3BaSO_4 + 2AlCl_3$$

$$(iii)\ 2FeSO_4 \xrightarrow{\text{heat}} Fe_2O_3 + SO_2 + SO_3$$

Answer.

(i) Combination reaction
(ii) Double displacement reaction (Precipitation reaction)
(iii) Decomposition reaction.

6. Write the chemical equation of the reaction in which the following changes have taken place with an example of each:
(i) Change in colour
(ii) Change in temperature
(iii) Formation of precipitate

Answer.

(i)$Cu\ (s) + 2AgNO_3\ (aq)$———–> $Cu(NO_3)_2(aq) + 2Ag$
The solution will become blue in colour and shiny silver metal will be deposited.
(ii) $NaOH + HCl$ ———–> $NaCl + H_2O$+ heat
The temperature will increase because heat will be evolved.
(iii) $Pb(NO_3)2\ (aq) + 2KI\ (aq)$———–> $PbI_2\ (s) + 2KNO_3\ (aq)$
Yellow ppt
Yellow precipitate of PbI_2will be formed.

7.State the type of chemical reactions and chemical equations that take place in the following:
(i) Magnesium wire is burnt in air.
(ii) Electric current is passed through water.
(iii) Ammonia and hydrogen chloride gases'are mixed.

Answer.

(*i*) $2Mg\ (s) + O_2\ (g) \longrightarrow 2MgO\ (s)$

Combination reaction (Redox reaction).

(*ii*) $2H_2O\ (l) \xrightarrow{\text{electrolysis}} 2H_2\ (g) + O_2\ (g)$

Electrical decomposition reaction.

(*iii*) $NH_3\ (g) + HCl\ (g) \longrightarrow NH_4Cl\ (s)$

Combination reaction.

8.(a) Write the essential condition for the following reaction to take place: $2AgBr \text{—->} 2Ag + Br_2$

Write one application of this reaction.

(b) Complete the following chemical equation of a chemical reaction $2FeS04$ —

$$2FeSO_4 \xrightarrow{\text{heat}} Fe_2O_3 + ... + ...$$

(c) What happens when water is added to quick line. Write chemical equation.

Answer.

(*a*) $2AgBr \xrightarrow{\text{Sunlight}} 2Ag + Br_2$

This reaction is used in photography.

(*b*) $2FeSO_4 \xrightarrow{\text{heat}} Fe_2O_3 + SO_2 + SO_3$

(c) Slaked lime is formed with hissing sound and lot of heat is envolved.

9. 2g of ferrous sulphate crystals are heated in a dry boiling tube.

(i) List any two observations.

(ii) Name the type of chemical reaction taking place.

(iii) 'Write the chemical equation for the reaction.

Answer.

(i) •Green colour of Fe SO_4 disappears and reddish brown solid is formed.

• Smell of burning sulphur.

(ii) Decomposition reaction

(*iii*) $2FeSO_4\ (s) \xrightarrow{\text{heat}} Fe_2O_3\ (s) + SO_2\ (g) + SO_3\ (g)$

10. What is observed when a solution of potassium iodide solution is added to a solution of lead nitrate? Name the type of reaction. Write a balanced chemical equation to represent the above chemical reaction.

Answer. Yellow precipitate of lead iodide is formed. It is precipitation reaction.

$Pb(NO_3)_2\ (aq) + 2KI\ (aq) \text{—->} PbI_2\ (s) + 2KNO_3\ (aq)$

It is also called double displacement reaction.

11.Write chemical equation reactions taking place when carried out with the help of

(a) Iron reacts with steam

(b) Magnesium reacts with dil HCl

(c) Copper is heated in air.

Answer.

(a) $3Fe\ (s) + 4H_2O\ (g) \longrightarrow Fe_3O_4\ (s) + 4H_2\ (g)$

(b) $Mg + 2HCl \longrightarrow MgCl_2 + H_2$

(c) $2Cu + O_2 \xrightarrow{heat} 2CuO\ (s)$

12.Which products will be obtained when lead nitrate is heated simply. Write balanced chemical equation for the reaction? State the type of chemical reaction that occur in the change.

Answer. Lead monoxide, nitrogen dioxide and oxygen gas will be liberated.

(a) $3Fe\ (s) + 4H_2O\ (g) \longrightarrow Fe_3O_4\ (s) + 4H_2\ (g)$

(b) $Mg + 2HCl \longrightarrow MgCl_2 + H_2$

(c) $2Cu + O_2 \xrightarrow{heat} 2CuO\ (s)$

13. What is meant by skeletal type chemical equation? What does it represent? Using the equation for electrolytic decomposition of water, differentiate between a skeletal chemical equation and a balanced chemical equation.

Answer. The equations in which gaseous are written in atomic form instead of molecular form and equation is not balanced, are called skeletal type equation. They represent gaseous elements formed in atomic state and equation is not balanced

$H_2O \rightarrow H + O$ (Skeletal Equation)

Hydrogen and Oxygen written in atomic form and are not balanced.

$H_2O \rightarrow H_2 + O_2$ (This is also a skeletal equation but not balanced.)

$2H_2O \rightarrow 2H_2 + O_2$ (This is a balanced skeletal Chemical Equation.)

14.Write balanced chemical equations for the following reactions.
(i) Silver bromide on exposure to sunlight decomposes into silver and bromine,
(ii) Sodium metal reacts with water to form sodium hydroxide and hydrogen gas.
Answer.

$$(i)\ 2AgBr(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Br_2(g)$$
$$(ii)\ 2Na(s) + 2H_2O(l) \longrightarrow 2NaOH(aq) + H_2(g)$$

15.Identify the type of reaction(s) in the following equations.
(i)$CH_4 + 2O_2 \rightarrow CO_2 + 2\ H_2O$
(ii) $Pb(NO_3)2 + 2KI$ ——–>$PbI_2 + 2KNOs$
(iii) $CaO + H_2O$ ——–> $Ca(OH)_2$
(iv) $CuSO_4 + Zn$ ——–> $ZnSO_4 + Cu$
Answer.
(i) Combustion reaction and oxidation reaction.
(ii)Double displacement reaction and precipitation reaction.
(iii) Combination reaction.
(iv) Displacement reaction.

16.Write balanced equation for the reaction between magnesium and hydrochloric acid. Name the product obtained, identify the type of reaction.
Answer.

$$Mg(s) + 2HCl(dil.) \longrightarrow MgCl_2(aq) + H_2(g)$$

17. Translate the following statement into chemical equation and then balance it Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate. State the two types in which this reaction can be classified.
Answer. $3BaCl_2(aq) + Al_2(S0_4)_3(aq)$ ——–> $3BaS0_4(s) + 2AlCl_3(aq)$
It can be classified as double displacement as well as precipitation reaction.

18. What is rancidity? Mention any two ways by which rancidity can be prevented.

Answer. The process in which taste and smell of food gets spoiled is called rancidity. It happens due to oxidation.

Prevention from rancidity:

(i) Antioxidants are added to fatty acids to prevent oxidation, e.g. chips are packed in presence of nitrogen gas which prevents spoilage by oxidation.

(ii)Food should be kept in airtight container in refrigerator.

19. What is redox reaction? Identify the substance oxidised and the substance reduced in the following reactions.

(i)$2PbO + C \longrightarrow 2Pb + CO_2$

(ii)$MnO_2 + 4HCl \longrightarrow MnCl_2 + 2H_20 + Cl_2$

Answer. Those reactions in which oxidation and reduction takes place simultaneously are called redox reactions.

(i) PbO is getting reduced and C is getting oxidised.

(ii) MnO is getting reduced and HCl is getting oxidised

20. Write the balanced chemical equations for the following reactions and identify the type of reaction in each case.

Thermite reaction, iron (III) oxide reacts with aluminium and gives molten iron and aluminium oxide.

Answer.

$$\underset{\text{Iron (III) oxide}}{Fe_2O_3(s)} + \underset{\text{Aluminium}}{2Al(s)} \longrightarrow \underset{\text{Aluminium oxide}}{Al_2O_3(s)} + \underset{\text{Molten iron}}{2Fe(l)} + \text{heat}$$

It is a displacement reaction because Al is displacing Fe from Fe_2O_3.

Molten iron is used for repairing broken railway tracks.