1. CHEMICAL REACTION AND EQUATION

1. which of the statements about the reaction below are incorrect?

$2PbO(s) + C(s) \Rightarrow 2Pb(s) + CO_2(g)$

(a) Lead is getting reduced.
(b) Carbon dioxide is getting oxidized.
(c) Carbon is getting oxidized
(d) Lead oxide is getting reduced.

(i) (a) and (b) (ii) (a) and (c)
(iii) (a), (b) and (c) (iv) all

Ans:- (i) (a) and (b)

2. $Fe_2O_3 + 2Al \Rightarrow Al_2O_3 + 2Fe$

the above reaction is an Example of a
(a) Combination reaction. (b) Double displacement reaction
(c) Decomposition reaction (d) Displacement reaction.

Ans:- (d) displacement reaction.

3. 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.

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

4. what is a balanced chemical Equation? why should chemical Equations be balanced?

Ans:- A reaction which has an Equal number of atoms of all the elements on both sides of the chemical Equation is called a balanced chemical Equation. the law of conservation of mass states that mass can neither be Created nor destroyed. Hence, in a chemical reaction, the total mass of reactants should be Equal to the total mass of the products. It means that the total number of atoms of Each Element should be Equal on both sides of a chemical Equation. Hence it is for this reason that chemical Equations should be balanced. Both sides of a chemical Equation.

5. Translate the following statements into chemical Equations and then balance them. then balance them.

(a) Hydrogen gas combines with nitrogen to form ammonia.

Ans:- $N_{2(g)} + 3H_{2(g)} \rightarrow NH_3$

(b) Hydrogen Sulphide gas burns in air to give water and sulphur dioxide, sulphate.

Ans: $2H2S_{(g)} + 3O2_{(g)} \rightarrow 2H2S_{(g)} + 2H2O_{(l)}$

Hydrogen Sulphide — Air — sulpur dioxide — water

(c) Barium chloride reacts with aluminium sulphate to give aluminium chloride and precipitate of barium.

Ans:- $3BaCl_2(aq) + Al_2(SO_4)_3(aq) \rightarrow 2AlCl_3(aq) + 3BaSO_4(s)$

Barium chloride Aluminium sulphate Aluminium chlor 3 $BaSO_4(s)$

(d) potassium metal reacts with water to give potassium hydroxide and hydrogen gas.

Ans:-

$2K(s) + 2H_2O(l) \rightarrow 2KOH(aq) + H_2(g)$

Potassium water potassium hydroxide Hydrogen

6. Balance the following chemical equations:

(a) $HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + H_2O$

Ans:- $2HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + 2H_2O$

(b) $NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$

$2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

(c) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$

$NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$

(d) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + HCl$

$BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$

7. Write the balanced chemical equations for the following reactions.

(a) Calcium hydroxide + Carbon dioxide $\rightarrow$ Calcium carbonate + Water

Ans:- $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$

(b) Zinc + Silver nitrate $\rightarrow$ Zinc nitrate + Silver

$Zn + 2AgNO_3 \rightarrow Zn(NO_3)_2 + 2Ag$

(c) Aluminium + Copper chloride → Aluminium chlori + Copper.

$2Al + 3CuCl_2 \rightarrow 2AlCl_3 + 3Cu$

(d) Barium chloride + potassium sulphate → Barium sulphate + potassium chloride

$BaCl_2 + K_2SO_4 \rightarrow BaSO_4 + 2KCl$

8. 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)

$2KBr(aq) + BaI_2(aq) \rightarrow 2KI(aq) + BaBr_2(s)$

In this reaction, both the reactants exchange ions to form two new products. Hence, it is a double displacement reaction

(b) Zinc Carbonate (s) → Zinc Oxide (s) + Carbon dioxide

$ZnCO_3(s) \rightarrow ZnO(s) + CO_2(g)$

In this reaction, a single substance yields two different products. Hence, it is a decomposition reaction.

(c) Hydrogen (g) + chlorine (g) → Hydrogen chloride (g)

$H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$

In this reaction, two different reactants react with Each other to form a single product.

Hence, it is called a combination reaction

(d) Magnesium (s) + Hydrochloric acid (aq) → Magnesium chloride (aq) + Hydrogen (g)

$Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$

In this reaction, more reactive Mg is replacing less reactive H. Hence, it is displacement reaction.

9. What does one mean by Exothermic and Endothermic reactions? Give Examples.

Ans:- Exothermic Reaction:

Chemical reactions that release Energy in the form of heat, light, or sound are called Exothermic reactions.

for Example: Burning of methane in air gives heat and light.

$CH_4(g) + O_2(g) \rightarrow CO_2(g) + 2H_2O(g) + heat$

Endothermic Reaction:

Reactions that absorb Energy or require Energy in order to proceed are called Endothermic reactions.

for Example: silver chloride absorbs the heat from sunlight and gets decomposed into silver and chlorine.

$2AgCl(s) \xrightarrow{Sunlight} 2Ag(s) + Cl2(g)$

10. Why respiration is considered and an Exothermic reaction? Example. Explain.

Ans:- Energy in our body is obtained from the food we Eat. During digestion, large molecules of food are broken down into simpler substances such as glucose. Glucose combines with oxygen in the cells and provides energy. the special name of this combustion reaction is respiration. since energy is released in the whole process, it is an Exothermic process.

$$C_6H_{12}O_6(aq) + 6O_{2(g)} \rightarrow 6CO_{2(g)} + 6H_2O(l) + Heat$$

Glucose oxygen carbon dioxide water

11. Why decomposition reactions are called the opposite of combination reactions? write Equations for these reactions.

Ans:- Decomposition reactions are those in which a compound breaks down into two or more substances. these reactions require a source of energy to proceed. thus, they are the Exact opposite of combination reactions in which two or more substances combine to give a new substance with the release of Energy. Decomposition Reaction

$AB + Energy \rightarrow A + B$

$$2AgCl(s) \xrightarrow{Sunlight} 2Ag(s) + Cl_2(g)$$

Combination Reaction:

$A + B \rightarrow AB + \text{Energy}$

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

Ans:- Decomposition due to heat:

$$CaCO_3(s) \xrightarrow{\text{Heat}} CaO(s) + CO_2(g)$$

Decomposition due to light: sunlight

$$2AgCl(s) \xrightarrow{\text{sunlight}} 2Ag(s) + Cl_2(g)$$

Decomposition due to electricity:

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

13. What is the difference between displacement and double displacement reactions? Write equations for these reactions.

Ans:- Displacement Reaction:

In a displacement reaction, a more reactive element replaces a less reactive element from a compound. Here A is more reactive than B.

$$Zn(s) + 2AgNO_3(aq) \rightarrow Zn(NO_3)_2(aq) + 2Ag(s)$$

zinc — silver nitrate — zinc nitrate — silver

Here Zn is more reactive than Ag.

Double Displacement Reaction:

In a double displacement reaction, two atoms or a group of atoms switch places to form new compounds.

$AM + BN \rightarrow AN + BM$

$2KBr(aq) + BaI_2(aq) \rightarrow 2KI(aq) + BaBr_2(s)$

Potassium bromide — Barium Iodide — potassium iodide — Barium bromide

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

Ans:- $Cu(s) + 2AgNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + 2Ag(s)$

Copper — silver nitrate — copper nitrate — silver

15. What do you mean by a precipitation reaction? Explain by giving examples.

Ans:- A reaction in which an insoluble solid (called precipitate) is formed is called a precipitation reaction.

$BaCl_2 + K_2SO_4 \rightarrow BaSO_4 + 2KCl$

Barium chloride — potassium sulphate — Barium sulphate — Potassium chloride

In this reaction, barium sulphate is obtained as a precipitate. Hence, it is a precipitation reaction.

16. Explain the following in terms of gain or loss of oxygen with two examples each.

(a) oxidation

(b) Reduction

(a) Oxidation: Oxidation is the gain of oxygen.

$C + O_2 \rightarrow CO_2$

Here, carbon (c) is oxidised to carbon dioxide (CO_2)

$2Cu + O_2 \rightarrow 2CuO$

and cuppor is oxidesed to copper (Cu) is oxidesed to copper oxide (CuO).

(b) Reduction: Reduction is the loss of oxygen.

$CO_2 + H_2 \rightarrow CO + H_2O$

Here, carbon dioxide (CO_2) is reduced to carbon monoxide (CO)

$CuO + H_2 \xrightarrow{Heat} Cu + H_2O$

Copper oxide (CuO) is reduced to copper (Cu).

17. A shiny brown colored element 'x' on heating in air becomes black in color. Name the element 'x' and the black colored compound formed.

Ans:- The element 'x' is copper (Cu) which is converted into black coloured copper oxide (CuO).

$2Cu + O_2 \xrightarrow{HEAT} 2CuO$

shiny brown colored element black colored element.

18. Why do we apply paint on iron articles?

Ans:- Iron articles are painted because.

Applying paints prevents them from rusting. when painted, the contact of iron articles from moisture and air is cut off. Hence, rusting is prevented their presence is Essential for rusting to take place.

19. Oil and fat containing food items are flushed with nitrogen. why?

Ans:- Nitrogen is an inert gas (at room temperat and does not easily react with oil and fact containing items. On the other hand oxygen reacts with food substances and makes them rancid. thus, bags used in packing fo items are flushed with nitrogen gas to remove oxygen inside the pack. when oxygen is not present inside the pack, rancidity of oil and fat containing food items is avoided.

20. Explain the following terms with one Examp Each.

(a) Corrosion (b) Rancidity

Ans:- (a) Corrosion:

Corrosion is defined as a process where materials, usually metals, deteriorate as result of a chemical reaction with air, moisture, chemicals, etc.

Iron, in the presence of moisture, react with oxygen to form hydrated iron oxide

(a brown flaky substance) called rust. Silver articles become black after some time when exposed to air. this is because it reacts with sulphur in the air to form a coating of silver sulphide. Copper reacts with moist carbon dioxide in the air and slowly loses its shiny brown surface and gains a green coat. This green substance is Copper carbonate.

(b) Rancidity :

The process of oxidation of fats and oils that can be easily noticed by the change in taste in taste and smell is known as rancidity. for Example : the taste and smell of butter changes when kept for long. Rancidity can be avoided by: storing food in air tight Containers Adding antioxidants storing food in an Environment of nitrogen.

THE END.

11/7/24