WORKSHEET 1

CHAPTER 1 – CHEMICAL REACTIONS

A. Tick (✓) the correct option.

1. Magnesium ribbon burns with a dazzling flame and changes into a white powder. The chemical formula of this powder is

   a. Mg_2O b. MgO c. MgO_2 d. Mg_2O_3

2. Which of the following equations represents a double displacement reaction?

   a. $CaO + H_2O \rightarrow Ca(OH)_2$

   b. $CaCO_3 \xrightarrow{\text{Heat}} CaO + CO_2$

   c. $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$

   d. $Pb(NO_3)_2 + 2KI \rightarrow PbI_2 + 2KNO_3$

3. Which of the following elements will not displace copper from copper sulphate solution?

   a. Fe b. Pb c. Ag d. Al

4. In the given reaction,

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

   the substance being reduced is

   a. CuO b. H_2 c. Cu d. H_2O

5. In the experiment to determine the conditions necessary for rusting of iron, oil is added

   a. to prevent air from dissolving in water.

   b. to absorb moisture from the air.

   c. to allow air to come in contact with water.

   d. to induce precipitation of iron.

B. Complete the following chemical equations and balance them.

a. $Zn + H_2SO_4 \rightarrow$

b. $2H_2 + O_2 \rightarrow$

c. $C_2H_6 + O_2 \rightarrow$

d. $Fe + 4H_2O \rightarrow$

e. $NaOH + H_2SO_4 \rightarrow$

C. Fill in the blanks.

a. The substances formed in a chemical reaction are known as _____

b. Burning of LPG is an _____ reaction.

c. Thermal decomposition of ferrous sulphate produces two gases, _____

d. In a double displacement reaction, there is an exchange of _____ between the reactants.

e. The process in which iron is protected from rusting by coating it with a layer of tin is known as _____

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D. State whether the following statements are true or false.

a. In a balanced chemical equation, the number of atoms of each element is more on the product side than on the reactant side.

b. The decomposition of a compound by light is known as photolysis.

c. Respiration is an endothermic process.

d. Copper cannot displace silver from a solution of silver nitrate.

e. Keeping food in air tight containers helps to slow down oxidation.

E. Match the following.

a. Balancing of chemical equations:	Law of conservation of mass
b. Insoluble substance formed in a reaction:	Antioxidant
c. $BaCl_2 + H_2SO_4 \rightarrow$	Rust
d. Substance added to fat containing food to prevent its oxidation:	Precipitate
e. Hydrated iron(III) oxide:	$BaSO_4 + 2HCl$

F. Answer the following questions.

Very Short Answer Questions

1. How would you categorise the following reaction? Give reasons to support your answer.

$$2H_2 + O_2 \rightarrow 2H_2O$$

2. Write an example of a double displacement reaction.

Short Answer Questions

1. When an iron nail was added to a solution of copper sulphate, the colour of the solution changed from blue to light green and a red-coloured substance was deposited on the nail. However, when silver was added to copper sulphate solution, then no change was observed in the colour of the solution. Explain.

2. What is a redox reaction? When a magnesium ribbon burns in air, is it oxidised or reduced?

Long Answer Questions

1. What are the different types of chemical reactions? Discuss any two of them with the help of examples.

2. Write the balanced chemical equations for the following reactions and identify the type of reaction:

a. Nitric oxide reacts with oxygen and forms nitrogen dioxide.

b. Lead nitrate on heating forms lead oxide, nitrogen dioxide and oxygen.

c. Potassium bromide reacts with barium iodide to form potassium iodide and barium bromide.

d. Magnesium reacts with water to form magnesium hydroxide.

e. Zinc reacts with iron(II) sulphate to form zinc sulphate and iron.

ANSWERS

WORKSHEET 1

A. Tick (✓) the correct option.

1. b 2. d 3. c 4. a 5. a

B. Complete the following chemical equations and balance them.

a. $ZnSO_4 + H_2 \rightarrow ZnSO_4 + H_2$

b. $2H_2 + O_2 \rightarrow 2H_2O$

c. $2C_2H_6 + 7O_2 \rightarrow 6H_2O + 4CO_2$

d. $3Fe + 4H_2O \rightarrow Fe_3O_4 + H_2$

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

C. Fill in the blanks.

a. reactants
b. exothermic
c. sulphur dioxide and sulphur trioxide
d. ions
e. tinning

D. State whether the following statements are true or false.

1. F 2. T 3. F 4. F 5. T

E. Match the following.

a. Balancing of chemical equations:	Law of conservation of mass
b. Insoluble substance formed in a reaction:	Precipitate
c. $BaCl_2 + H_2SO_4 \rightarrow$	$BaSO_4 + 2HCl$
d. Substance added to fat containing food to prevent its oxidation:	Antioxidant
e. Hydrated iron(III) oxide:	Rust

F. Answer the following questions.

Very Short Answer Questions

1. The given reaction would be categorised as a combination reaction because only a single product is formed from two reactants.

2. The reaction between barium chloride and sodium sulphate is an example of a displacement reaction. The equation for the reaction is as follows:

$$BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$$

Short Answer Questions

1. Iron is more reactive than copper. Therefore, when an iron nail is place in copper sulphate solution, iron will displace copper from its salt and form iron(II) sulphate. The displaced copper will be deposited on the nail. The chemical equation for the reaction is as follows:

$$Fe + CuSO_4 \rightarrow FeSO_4 + Cu$$

On the other hand, silver is less reactive than copper. So, when silver is placed in copper sulphate solution, it does not displace copper from its salt. In other words, no reaction occurs between silver and copper sulphate solution. Hence, the colour of the solution remains unchanged.

2. A reaction in which oxidation and reduction take place simultaneously is known as a redox reaction. A magnesium ribbon burns in air with a dazzling flame and forms a white powder. This white powder is magnesium oxide. It is formed due to the reaction between magnesium and oxygen present in air. The equation for the reaction is as follows:

$$2Mg + O_2 \rightarrow 2MgO$$

Since in the above reaction, oxygen is added to magnesium, therefore, it is being oxidised.

Long Answer Questions

1. There are mainly five types of chemical reactions. These are:
   a. Combination reactions
   b. Decomposition reactions
   c. Displacement reactions
   d. Double displacement reactions
   e. Redox reactions

Combination reactions: The reactions in which a single product is formed from two or more reactants are known as combination reactions. These can be represented by the following general equation:

$$A + B \rightarrow AB$$

For example, burning of coal is a combination reaction. The carbon present in coal combines with oxygen to form carbon dioxide.

$$C + O_2 \rightarrow CO_2$$

Decomposition reactions: The reactions in which a single reactant breaks down into two or more simpler substances is known as a decomposition reaction. These can be represented by the following general equation:

$$AB \rightarrow A + B$$

Decomposition reactions are of the following three types:

   a. Thermal decomposition
   b. Electrolytic decomposition
   c. Photochemical decomposition

The decomposition of calcium carbonate into calcium oxide and carbon dioxide on heating is an example of thermal decomposition reaction, in which decomposition of the reactant is brought about by heat.

$$CaCO_3 \xrightarrow{\text{Heat}} CaO + CO_2$$

2. a. $2NO + O_2 \rightarrow 2NO_2$, combination reaction
   b. $2Pb(NO_3)_2 \xrightarrow{\Delta} 2PbO + 4NO_2 + O_2$, decomposition reaction
   c. $2KBr + BaI_2 \rightarrow 2KI + BaBr_2$, double displacement reaction
   d. $Mg + H_2O \rightarrow Mg(OH)_2$, combination reaction
   e. $Zn + FeSO_4 \rightarrow ZnSO_4 + Fe$, displacement reaction