

Class- VIII

Ch-6- Chemical Reaction

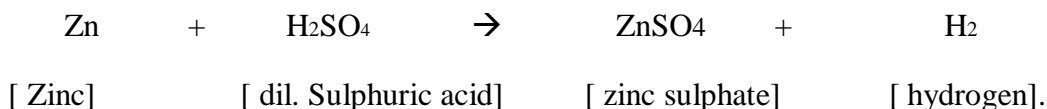
Exercise-I

Ans:- 1.

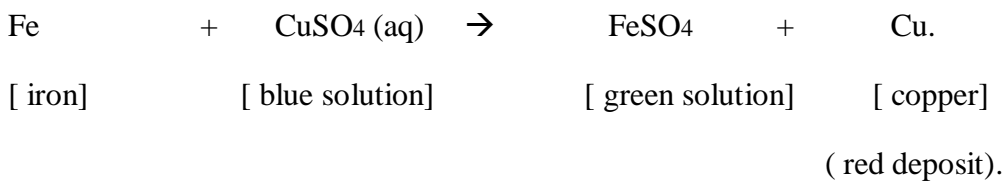
- (a) Any chemical change in matter which involves transformation into one or more substances with entirely different properties is called a chemical reaction.
- (b) A chemical reaction involves breaking of chemical bonds between the atoms or groups of atoms of reacting substances and rearrangement of atoms making new bonds to form new substances with absorption or release of energy normally in the form of heat and light.
- (c) A chemical bond is the attractive force that holds the atoms of a molecule together in a compound.

Ans:- 2.

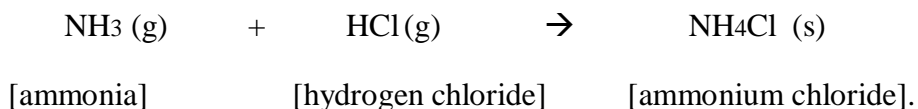
- (a) When zinc reacts with dilute sulphuric acid, hydrogen gas is evolved, with an effervescence.



- (b) When a few pieces of iron are dropped into a blue coloured copper sulphate solution, the blue colour of the solution fades and eventually turns into light green.



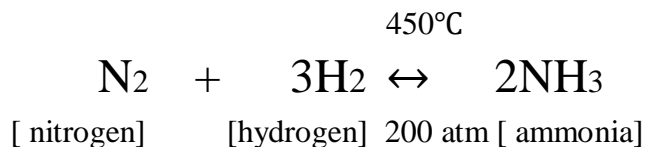
- (c) The reaction between ammonia and hydrogen chloride gases produce ammonium chloride which is a white solid.



Ans:-3.

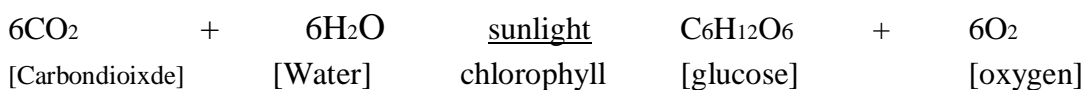
(a) Some chemical reactions take place when the reactants are subjected to high pressure.

Example- Nitrogen and hydrogen when subjected to high pressure, produce ammonia gas



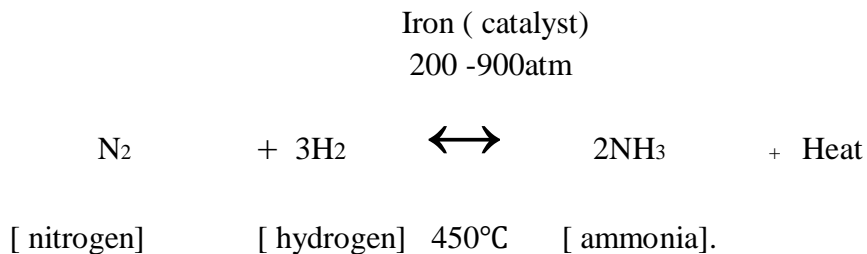
(b) Some chemical reactions can take place only in the presence of light. They are called photochemical reactions.

Example:- Photosynthesis is a chemical reaction in which food is prepared by the green leaves of a plant, but light is necessary for the reaction to take place.



(c) Some chemical reactions need a catalyst to change the rate of the reaction, in case it is too slow or too fast.

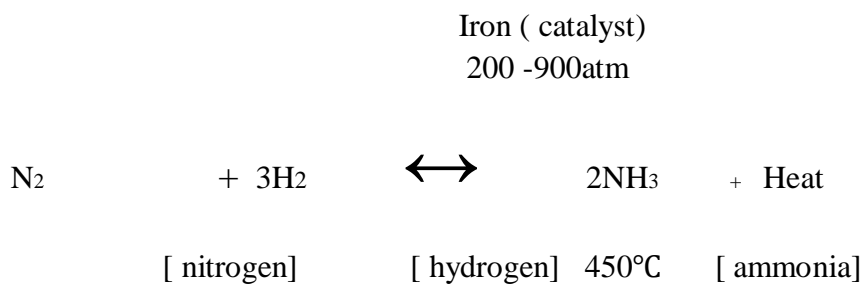
Example:- Finely divided iron is used as a positive catalyst in the manufacture of ammonia from hydrogen and nitrogen.



Ans:- 4.

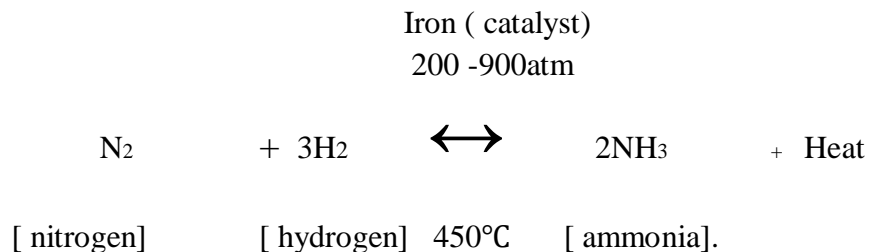
- (a) A catalyst is a substance that either increases or decreases the rate of a chemical reaction without itself undergoing any chemical change during the reaction.

Example:-Finely divided iron is used as a positive catalyst in the manufacture of ammonia from hydrogen and nitrogen.



- (b) (i) When a catalyst increases the rate of a chemical reaction, it is known as a positive catalyst.

Example:-Finely divided iron is used as a positive catalyst in the manufacture of ammonia from hydrogen and nitrogen.



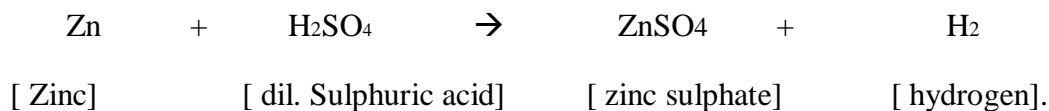
- (ii)When a catalyst decreases the rate of a chemical reaction, it is known as a negative catalyst.

Example:- Phosphoric acid acts as a negative catalyst to decrease the rate of decomposition of hydrogen peroxide.

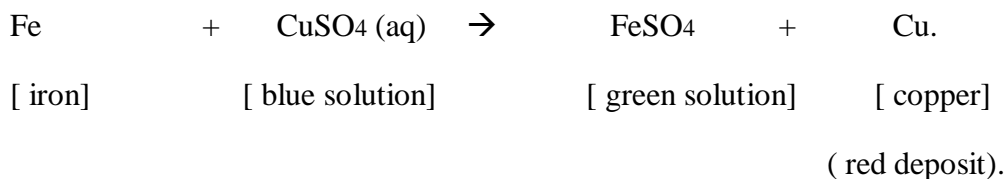
- (c) Amylase, trypsin and lipase.

Ans:- 5.

- (a) When zinc reacts with dilute sulphuric acid, hydrogen gas is evolved, with an effervescence.

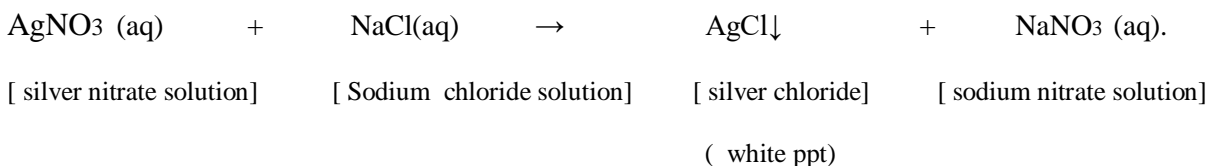


(b) When a few pieces of iron are dropped into a blue coloured copper sulphate solution, the blue colour of the solution fades and eventually turns into light green.



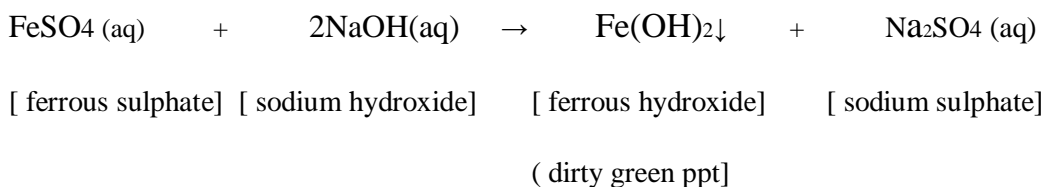
(c) When a solution of silver nitrate is added to a solution of sodium chloride, a white insoluble substance (precipitate), silver chloride, is formed.

Example:-



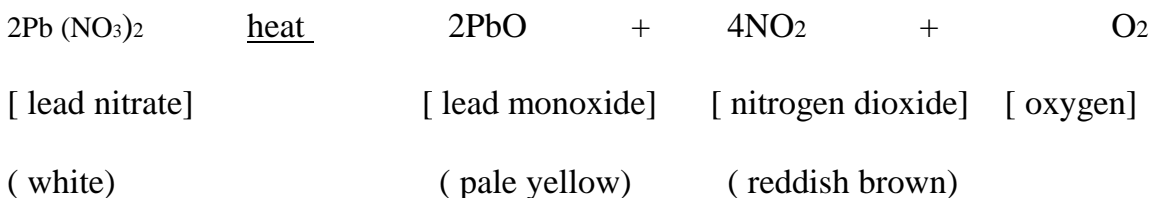
(d) When ferrous sulphate solution is added to sodium hydroxide solution, a dirty green precipitate of ferrous hydroxide is formed.

Example:-



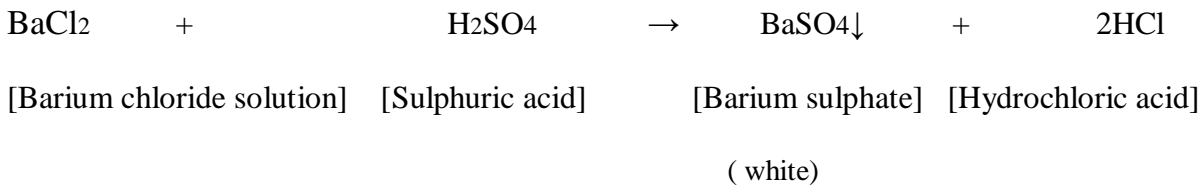
(e)When lead nitrate is heated, it breaks down into lead monoxide, nitrogen dioxide and oxygen.

Example:-

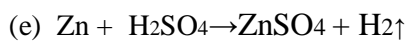
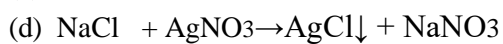
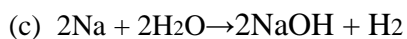
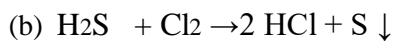
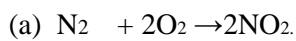


(f) When few drops of dilute sulphuric acid is added to barium chloride solution, a white precipitate of barium sulphate is formed.

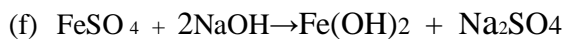
Example:-



Ans. 6.



(dil)



(aq) (aq)

heat



(aq) (aq)

END OF EXERCISE-I

CLASS-8
CHAPTER-6
CHEMICAL REACTIONS

Exercise – II

Question 1.

1. Fill in the blanks.

- (a) A reaction in which two or more substances combine to form a single substance is called a **combination** reaction.
- (b) A **catalyst** is a substance which changes the rate of a chemical reaction without undergoing a chemical change.
- (c) The formation of gas bubbles in a liquid during a reaction is called **effervescence**.
- (d) The reaction between an acid and a base is called a **neutralization reaction**.
- (e) Soluble bases are called **alkalis**.
- (f) The chemical change involving iron and hydrochloric acid illustrates a **displacement** reaction.
- (g) In the type of reaction called **double displacement reaction**, two compounds exchange their positive and negative radicals respectively.
- (h) A catalyst either **increases** or **decreases** the rate of a chemical change but itself remains **unchanged** at the end of the reaction.
- (i) The chemical reaction between hydrogen and chlorine is a **combination** reaction.
- (j) When a piece of copper is added to the silver nitrate solution, it turns **blue** in colour.

Question 2

Classify the following reactions as combination, decomposition, displacement, precipitation and neutralization. Also, balance the equations.

- (a) $\text{CaCO}_3(\text{s}) \xrightarrow{\text{heat}} \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
- (b) $\text{Zn}(\text{s}) + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4(\text{s}) + \text{H}_2(\text{g})$
- (c) $\text{AgNO}_3(\text{aq}) + \text{NaCl}(\text{aq}) \rightarrow \text{AgCl}(\text{s}) + \text{NaNO}_3$
- (d) $\text{NH}_3(\text{g}) + \text{HCl}(\text{g}) \rightarrow \text{NH}_4\text{Cl}(\text{s})$
- (e) $\text{CuSO}_4(\text{aq}) + \text{H}_2\text{S}(\text{g}) \rightarrow \text{CuS}(\text{s}) + \text{H}_2\text{SO}_4(\text{l})$
- (f) $\text{Zn}(\text{s}) + \text{CuSO}_4(\text{aq}) \rightarrow \text{ZnSO}_4(\text{aq}) + \text{Cu}(\text{s})$
- (g) $\text{Ca}(\text{s}) + \text{O}_2(\text{g}) \xrightarrow{\text{heat}} \text{CaO}(\text{s})$
- (h) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- (i) $\text{KOH} + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$

Solution:

- a) *Decomposition reaction, $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$*
- b) *Displacement reaction, $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$*
- c) *Precipitation reaction, $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$*
- d) *Combination reaction, $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$*
- e) *Double Displacement reaction, $\text{CuSO}_4 + \text{H}_2\text{S} \rightarrow \text{CuS} + \text{H}_2\text{SO}_4$*
- f) *Displacement reaction, $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$*
- g) *Combination reaction, $2\text{Ca} + \text{O}_2 \rightarrow 2\text{CaO}$*
- h) *Neutralization reaction, $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$*
- i) *Neutralization reaction, $2\text{KOH} + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$*

Question 3.

Define:

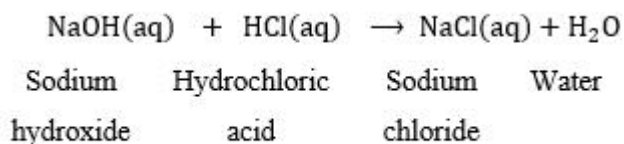
- (a) *Precipitation*
- (b) *Neutralization*
- (c) *Catalyst*

Solution:

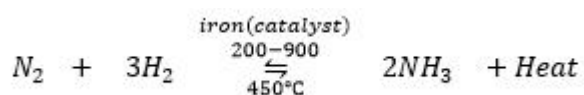
- (a) *Precipitation is a chemical reaction in which two compounds in their aqueous state react to form an insoluble solid as one of the product.*



(b) Neutralization is a chemical reaction in which a base or an alkali reacts, with an acid to produce a salt and water only.



(c) Catalyst is a substance that either increases or decreases the rate of a chemical reaction without itself undergoing any chemical change is called a catalyst.



Here iron act as a catalyst and increases the rate of the chemical reaction.

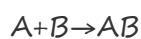
Question 4.

Explain the following types of chemical reactions giving two examples for each of them.

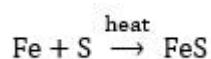
- (a) Combination reaction
- (b) Decomposition reaction
- (c) Displacement reaction
- (d) Double decomposition reaction

Solution:

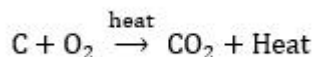
(a) A combination reaction is a chemical reaction in which involves two or more substances combine to form a single substance.



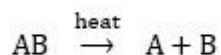
E.g. (i) When iron and sulphur are heated together, they combine to form iron sulphide.



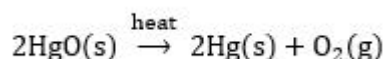
(ii) When carbon burns in oxygen to form a gaseous compound called carbon dioxide.



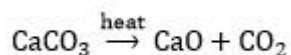
(b) In a decomposition reaction, a compound breaks up due to the application of heat into two or more simple substances.



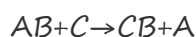
e.g. (i) Mercuric oxide when heated, decomposes to form two elements mercury and oxygen



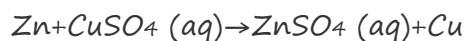
(ii) CaCO_3 when heated decomposes to calcium oxide and carbon dioxide.



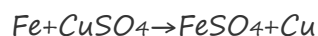
(c) A displacement reaction is a chemical reaction in which a more active element displaces a less active element from a compound.



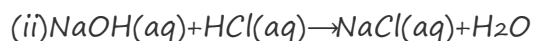
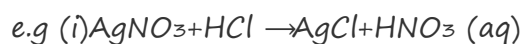
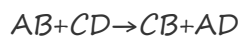
e.g. (i) Zinc displaces copper from copper sulphate solution.



(ii) Iron piece when added to copper sulphate solution, copper is displaced.



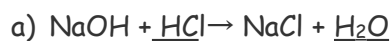
d) A chemical reaction in which two compounds in their aqueous state exchange their ions or radicals to form new compounds is called double decomposition or double displacement reaction.

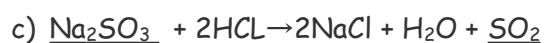
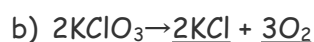


Question 5.

Write the missing reactants and products and balance the equations:

Solution:



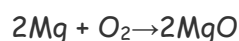


Question 6.

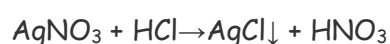
How will you obtain ?

Solution:

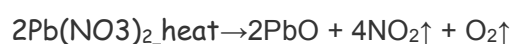
a) When Magnesium is burnt in air or oxygen Magnesium oxide is formed which is a white powder.



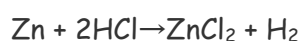
b) When Silver Nitrate solution reacts with Hydrochloric acid, Silver Chloride is formed .



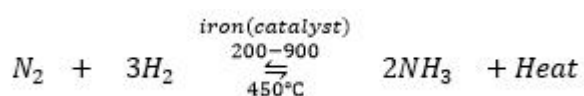
c) When Lead Nitrate is heated, nitrogen dioxide is formed.



d) Zinc when reacts with Hydrochloric acid, Zinc Chloride and Hydrogen gas is formed.



e) Nitrogen when reacts with Hydrogen at 450°C and under 200-900 atm, ammonia is formed.

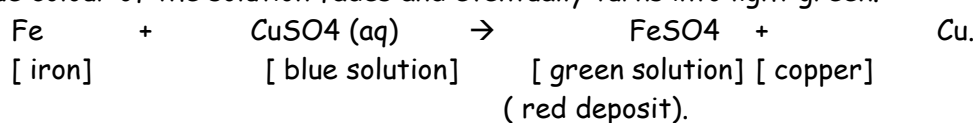


Question 7.

What do you observe when?

Solution:

a) When a few pieces of iron are dropped into a blue coloured copper sulphate solution, the blue colour of the solution fades and eventually turns into light green.



b) Solution turns pink because phenolphthalein is basic in nature.

- c) The litmus paper turns from blue to red as hydrochloric is acidic in nature.
- d) Lead nitrate is a white, crystalline solid. When heated strongly, it decomposes to produce light yellow solid lead monoxide, reddish brown nitrogen dioxide gas and colourless oxygen gas.

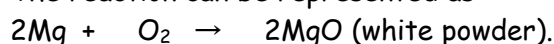
Example:-



[lead nitrate, white] [lead monoxide, Pale yellow] [nitrogen dioxide,reddishbrown]

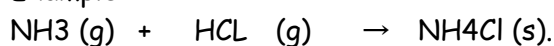
- e) Magnesium ribbon burns with a dazzling white light and produces a white powder which is magnesium oxide.

The reaction can be represented as:



- f) Ammonia gas and hydrogen chloride gas, both compounds, combine to form a compound ammonium chloride which is solid and white in colour.

Example:-



[ammonia]

[hydrogen chloride]

[ammonium chloride]

Question 8

Give reasons:

Solution :

- a) The acidity and indigestion can be overcome by taking antacids like milk of magnesia [$\text{Mg}(\text{OH})_2$] as antacids are basic in nature and can neutralize the acids formed.
- b) If the soil is acidic, it can be treated with bases like quick lime, chalk to make it neutral.
- d) Wasp stings are alkaline. They can be neutralized by vinegar which is a weak acid.

Question 9

What is meant by metal reactivity series? State its importance, (any two points).

Solution :

A list in which the metals are arranged in the decreasing order of their chemical reactivity is called the metal reactivity series.

Its importance are:

- a) The series facilitates the comparative study of metals in terms of the degree of their reactivity.
- b) The compounds of the metals (oxides, carbonates, nitrates and hydroxides) can be easily compared.

Question 10

What are oxides ? Give two examples of each of the following oxides.

- a) Basic oxide
- b) Acidic oxide
- c) Amphoteric oxide
- d) Neutral oxide

Solution :

An oxide is a compound which essentially contains oxygen in its molecule, chemically combined with a metal or a non-metal.

- a) Basic oxide-CaO, MgO
- b) Acidic oxide-CO₂, SO₂
- c) Amphoteric oxide-ZnO, PbO
- d) Neutral oxide-H₂O, CO

Question 11

Define exothermic and endothermic reactions. Give two examples of each.

Solution :

A chemical reaction in which heat energy is given out is called exothermic reaction. It causes a rise in temperature.

- a) $C + O_2 \rightarrow CO_2 + \text{Heat}$
- b) $CaO + H_2O \rightarrow Ca(OH)_2 + \text{Heat}$

A chemical reaction in which heat energy is absorbed is called endothermic reaction. It causes a fall in temperature.

- a) $N_2 + O_2 \xrightarrow{\text{Heat}} 2NO$
- b) $CaCO_3 \xrightarrow{\text{Heat}} CaO + CO_2$

Question 12

State the effect of:

- a) An endothermic reaction
- b) An exothermic reaction on the surroundings.

Solution :

- a) An endothermic reaction causes a fall in temperature in the surroundings.
- b) An exothermic reaction causes a rise in temperature in the surroundings.

Question 13

What do you observe when

- a) An acid is added to a basic solution.
- b) Ammonium chloride is dissolved in water.

Solution :

- a) When an acid reacts with a basic solution, salt and water is formed. Salt and water are neutral. The indicators will not show any characteristic colours for these neutral compounds.
- b) When ammonium chloride is dissolved in water, we will notice that the beaker containing the solution has become colder than it was earlier because dissolution of ammonium chloride is an endothermic reaction in which heat energy is absorbed.