

## 6. Chemical Reactions and their Types

### Exercises

#### 1 A. Question

Answer the following questions.

Name the different types of chemical reactions.

#### Answer

Different types of chemical reactions are:

- Combination Reaction
- Decomposition or Dissociation Reaction
- Displacement Reaction

##### 1. Combination Reaction:

Two or more reactants unite to form a single product.

General Form:  $A + B \rightarrow AB$

Eg:  $S + O_2 \rightarrow SO_2$

##### 2. Decomposition Reaction

A single reactant is decomposed or broken down into two or more products.

General Form:  $AB \rightarrow A + B$

Eg:  $CaCO_3 \rightarrow CaO + CO_2$

##### 3. Displacement Reaction

A reaction in which one constituent displaces another and separates is called displacement reaction.

General Form :  $A + BC \rightarrow B + AC$

Eg:  $Zn + 2 HCl \rightarrow H_2 + ZnCl_2$

#### 1 B. Question

Answer the following questions.

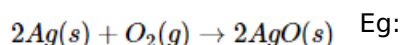
Explain the difference between a combination and dissociation reaction.

#### Answer

A combination reaction (also known as a synthesis reaction) is a reaction where two or more elements or compounds (reactants) combine to form a single compound (product).

Such reactions may be represented by equations of the following form:  $X + Y \rightarrow XY$ .

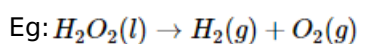
Here X and Y are the reactants and XY is the product.



A dissociation reaction is a chemical reaction where a compound breaks apart into two or more parts.

The general formula for a dissociation reaction follows the form:  $AB \rightarrow A + B$ .

Dissociation reactions are usually reversible chemical reactions.



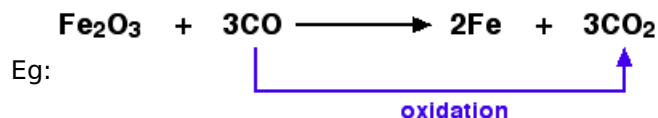
#### 1 C. Question

Answer the following questions.

Explain with examples what is meant by oxidation.

### Answer

In general, a reaction where oxygen is added or gained is called oxidation reaction. This definition is with respect to oxygen addition.



While a reaction where hydrogen is removed is also called oxidation reaction. An oxidizing agent (substance or chemical used for removal of hydrogen) is required to remove the hydrogen.

### 1 D. Question

Answer the following questions.

Explain with examples what is meant by reduction.

### Answer

A reaction where hydrogen is added or oxygen is removed is termed as reduction reaction. A reducing agent is used for this purpose.



Eg:

### 1 E. Question

Answer the following questions.

What is a catalyst?

### Answer

Substances that can alter or change the rate of a reaction are called catalyst. In simple words certain substances are added during a reaction to improve the speed of formation of products or to decrease the formation of unwanted products are catalysts.

Eg: Hydrogen peroxide will decompose into water and oxygen gas. Two molecules of hydrogen peroxide will produce two molecules of water and one molecule of oxygen. A catalyst of potassium permanganate can be used to speed up this process.

### 1 F. Question

Answer the following questions.

On what factors does the speed of chemical reactions depend?

### Answer

There are several factors that affect the speed of a reaction:

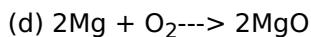
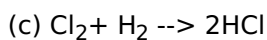
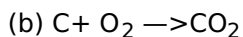
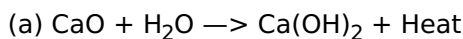
Some of them are: (of a reaction)

- Nature of the reactants.
- Particle size of the reactants.
- Concentration of the reactants.
- Pressure of gaseous reactants.
- Temperature.

•Catalysts.

## 2. Question

Of which type is each of the following reactions?



## Answer

(a) Exothermic reaction. Because on the product side heat is emitted. Exothermic reaction is one where heat is emitted.

(b) Combination reaction. Carbon and Oxygen combines together under certain condition to form carbon dioxide.

But this reaction can be a Combustion Reaction also. Because the burning of a compound with evolution of considerable amount of heat energy is called combustion. In this reaction C (carbon) is burnt in O<sub>2</sub> (Oxygen) and release heat energy.

(c) Combination Reaction as well as Reduction reaction.

As Hydrogen is added, this is a reduction reaction. And two compounds combine to form one, so a combination reaction too.

(d) This is a Combination and Oxidation reaction. As two products are added, it's a combination, while oxygen is one of the reactant which is added to the products, so it's an oxidation reaction.

## 3. Question

Write the equations for each of the following reactions and name the reactants and products of each.

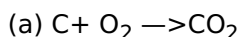
(a) Coal was burnt in air.

(b) Magnesium wire was lit.

(c) Dilute hydrochloric acid was poured on to some zinc.

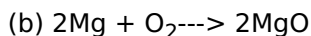
(d) Water was poured on calcium oxide.

## Answer



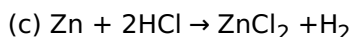
Reactants: Carbon\Coal and Oxygen

Products: Carbon Di Oxide



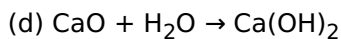
Reactants: Magnesium and Oxygen

Products: Magnesium Oxide (MgO)



Reactants: Zinc and Hydrochloric acid

Products: Zinc chloride and Hydrogen gas



Reactants: Calcium Oxide and Water

Products: Calcium Hydroxide

#### 4. Question

Match the following.

'A'	'B'
(a) Reduction	1. Type of chemical reaction
(b) Oxidation	2. Combining with hydrogen
(c) Displacement	3. speeding up a reaction
(d) Catalyst	4. Combination with oxygen

#### Answer

(a) Reduction	2. Combining with hydrogen
(b) Oxidation	4. Combination with oxygen
(c) Displacement	1. Type of chemical reaction
(d) Catalyst	3. speeding up a reaction

### Activities

#### 1. Question

Observe what happens when lemon juice falls on a Shahbad tile.

#### Answer

When lemon juice falls on shahbad tile which contains calcium carbonate the following chemical reaction occurs:

Calcium carbonate + lemon juice → Calcium Citrate + CO<sub>2</sub> gas

Calcium Citrate formed on tile leaves a white mark on tile which can be cleaned with water.

#### 2. Question

Find out about the effects that perfumes have on jewelry / ornaments.

#### Answer

Oils and chemicals in perfume can cause tarnish on silver or silver-plated jewelry, it can also damage other types of jewelry; porous stones and gems and costume jewelry. Tarnish can be removed from silver jewelry with a silver polishing cloth or ultrasonic jewelry cleaning machine.