



B. OXYGEN

EXERCISE — II

Question 1.

Name :

(a) The most abundant element in the earth's crust.

Ans. Oxygen.

(b) A chemical called oxygenated water.

Ans. H_2O_2 (Hydrogen peroxide)

(c) A metal highly resistant to rusting.

Ans. Tin.

(d) A mixture of oxygen and carbon dioxide used for artificial respiration.

Ans. Carbogen

(e) Two substances from which oxygen can be obtained at a large scale.

Ans. Air, water.

(f) An oxide and a carbonate containing oxygen.

Ans. Mercuric oxide and potassium chlorate.

(g) Two substances which undergo rapid oxidation.

Ans. Sodium, carbon.

Question 2.

(a) Taking hydrogen peroxide, how would you prepare oxygen in the laboratory ?

(b) What is the role of manganese dioxide in the preparation of oxygen ?

(c) Write the balanced chemical equation for the above chemical reaction.

(d) Why is hydrogen peroxide preferred in the preparation of oxygen gas ?

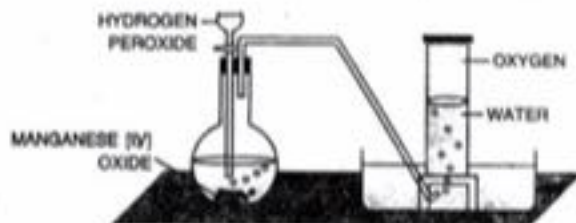
(e) Why is oxygen collected by downward displacement of water ?

(f) What happens when a glowing splinter is introduced in a jar containing oxygen ?

(g) What happens when oxygen gas is passed through alkaline pyrogallol solution ?

Answer:

(a) Take manganese dioxide in a round bottom flask and add hydrogen peroxide drop by drop to it, which acts as a catalyst as shown in the figure. Collect oxygen by downward displacement of water.



(b) Manganese dioxides acts as a catalyst.

(c) Hydrogen peroxide $\xrightarrow{\text{Manganese dioxide}}$ Water + Oxygen



(d) H_2O_2 is preferred for lab preparation of oxygen because of following reasons.

1. No heating is required.
 2. The rate of evolution of oxygen (O_2) is moderate and under control.
- H_2O_2 is a safe chemical.

(e) Since the water is displaced downward by the gas collecting in the jar, the process is called downward displacement of water. The reasons are :

1. Oxygen is only slightly soluble in water. Therefore it can be collected over water without fear of excessive dilution.



Air and Atmosphere



downward displacement of water. The reasons are :

1. Oxygen is only slightly soluble in water. Therefore it can be collected over water without fear of excessive dilution.
2. Oxygen is slightly heavier than air, so it cannot be collected over air.

(f) introduction of glowing splinter in the jar. The glowing splinter rekindles, but the gas does not catch fire.

(g) Alkaline pyrogallol solution turns brown when oxygen is passed through it.

Question 3.

(a) What happens when

1. mercuric oxide and
2. potassium nitrate are heated ?

(b) Why is potassium chlorate not used for laboratory preparation of oxygen ?

Answer: (a)

1. When mercuric oxide is heated, it decomposes to give mercury and oxygen.
2. Potassium nitrate on heating gets converted into molten potassium nitrite with the release of oxygen.

(b) Potassium chlorate needs heating for quite sometime (to a high temperature) before it decomposes.

Question 4.

What are oxides ? Give two examples for each of metallic and non-metallic oxides.

Answer:

Oxides are binary compounds formed by the chemical combination of a substance metal or a non-metal with oxygen.

Examples :

Metal:

1. Sodium oxide (Na_2O).
2. Calcium oxide (CaO).

Non-metal:

1. Sulphur dioxide (SO_2).
2. Carbon dioxide (CO_2).

Question 5.

Name the three types of oxidation processes. In which of these large amount of heat and light energy are produced?

Answer:

Oxidation can be categorised into three types :

1. Spontaneous oxidation
2. Rapid oxidation
3. Slow oxidation

Out of the above said three types, rapid oxidation produces large amount of heat and light energy.



Question 7.

- (a) State three uses of oxygen, other than artificial respiration.
(b) Give tests for oxygen gas.

Answer:

(a) Uses of oxygen are :

- **Spaceships** : Liquid oxygen is used for burning fuel in rockets and spaceships as there is no air in the space.
- **Cutting and welding** : Oxygen and hydrogen are made to burn in a specially designed torch. The oxy- hydrogen flame can easily melt metals and used for cutting and welding them.
- **Chemical industry** : Oxygen is used in large amount for preparing sulphuric acid from sulphur and nitric acid from ammonia.

(b) Tests for oxygen gas are :

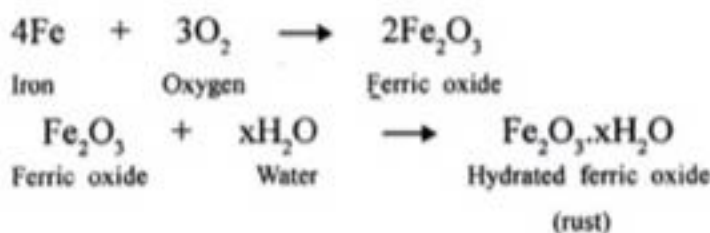
- It rekindles glowing wooden splinter.
- If mixed with colourless nitric oxide gas, it forms reddish brown fumes of nitrogen dioxide.
- It dissolves in alkaline pyrogallol solution and turns it brown.

Question 8.

- (a) What is (1) rust (2) rusting?
(b) State two most important conditions for rusting.
(c) State four ways of preventing rusting.

Answer:

- (a) 1. The hydrated oxide of iron formed when iron comes in contact with moist air is called rust. This rust is brownish flaky residue and easily crumbles from the metal surface.
2. The slow conversion of iron into its hydrated ferric oxide, in the presence of moisture and air is called rusting.



- (b) Two most important conditions for rusting are (1) presence of air and (2) moisture.
(c) Rusting Can be prevented by :

1. **Galvanising** – iron metal is coated with zinc.
2. **Enamelling** – iron surface is baked with mixture of silicates at high temperature.
3. Coating with red lead oxide paint or tar on iron surface.
4. Oils and grease coating on iron surface cuts off moist air and prevents rusting.