TENDER HEART SCHOOL, SEC-33B, CHD

CLASS- VII SUBJECT- CHEMISTRY
CHAPTER- 7 TEACHER- ANAMIKA

Good morning to all the students!

Students this lesson is for class - VII for the subject of chemistry Topic :- 'Constituents of air' which is covered in chapter - 7 'Air and Atmosphere' starting on page - 87 of your text book titled - concise chemistry by 'Selina Publication'

This voice is of ANAMIKA

All students may now please open page no - 87 of your notebook in front of you.

If all students are ready then let us start with this chapter. All students may now please listen carefully.

You know that, among food, water and air the most essential substance for the survival of life is air. A person can live without food for many days, without water for many hours but without air not even five minutes. It is used for respiration by all kinds of living beings.

Air occures in the atmosphere which surrounds the earth and extends to about 300 Km above its surface.

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Air also occurs in water in dissolved state which helps aquatic plants and animals to survive.

(A) AIR :- A Mixture of Gases

Constituents of Air

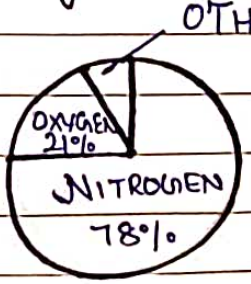
The main constituents of air are nitrogen and oxygen. It also contains carbon dioxide and water vapour in small amounts. Inert gases and ozone are also present in small amounts in air.

Apart from these gases, air also contains some other gases, like sulphur dioxide, hydrogen sulphide and nitrogen dioxide. Some impurities like dust particles, smoke and germs are also present in air.

Students, you may observe the 'percentage proportions of gases in air by volume' by Table-1 which is drawn on page-no-2 of the notes sent

Gases	% proportion
Nitrogen	78%
Oxygen	21%
Carbon dioxide	0.03% - 0.04%
Inert gases	0.9%
Water vapour	Variable
Dust particles	Variable
Impurities	Variable

Diagram



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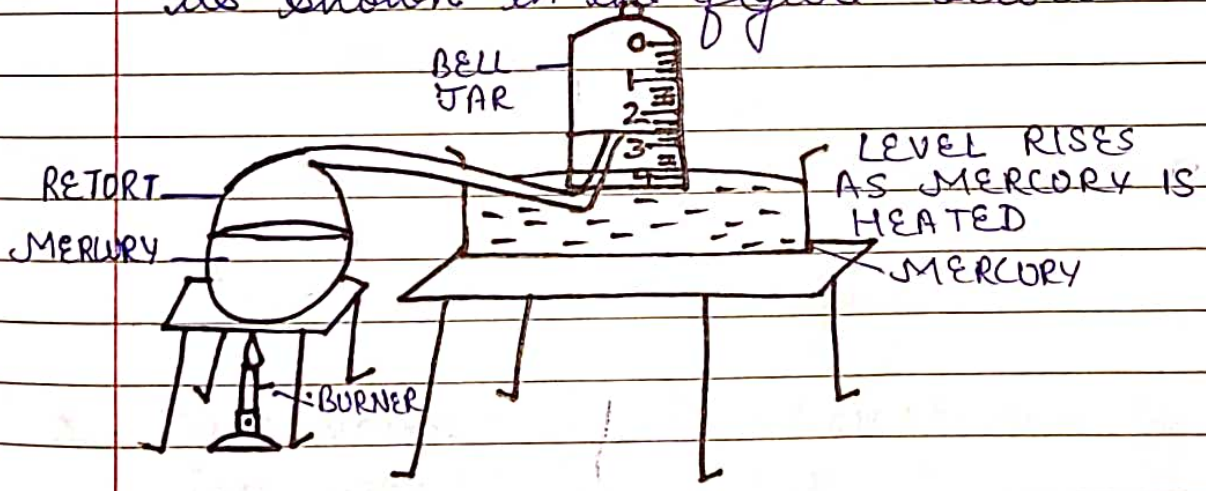
In ancient times air was considered as an element but now it has been proved that air is a mixture of gases. This was proved by Antoine Lavoisier in 1774 with the help of an experiment.

Lavoisier's experiment to show that nitrogen and oxygen are the main constituents of air:

Lavoisier took some mercury in a retord and heated it. The other end of the retort was connected to a bell jar containing air. The bell jar was kept in an inverted position over mercury contained in a trough as shown in the figure below



Lavoisier's Experiment

The following were his observations:-

1. A red layer of mercuric oxide was formed on the hot surface of mercury in the retord.

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2. The level of mercury in the trough rose by $\frac{1}{5}$ th of the total volume of the bell jar.

The following were his conclusions:-

1. The $\frac{1}{5}$ th portion of air in the bell jar was used up by mercury in the retort to form the red substance. This air was active air. This could be re-obtained on strongly re-heating the red substance. This gas supported burning better than air and also supported life. Lavoisier named this active air as "oxygen".

$$\text{Mercury} + \text{Oxygen} \xrightarrow{\text{heat}} \text{Mercury (II) oxide (Red powder)}$$

$$2Hg + O_2 \xrightarrow{\text{heat}} 2HgO$$

$$\text{Mercury (II) oxide} \xrightarrow{\text{heat}} \text{Mercury} + \text{Oxygen}$$

$$2HgO \xrightarrow{\text{heat}} 2Hg + O_2$$

2. The remaining $\frac{4}{5}$ th portion of air in the bell jar was inactive air as it did not support burning of air. It was found that this inactive air neither supports combustion (burning) nor life. The $\frac{4}{5}$ th air in the bell jar was tested by putting a burning candle into the gas. The flame was extinguished. It did not support life. The gas was named as azote meaning unsuitable for life. Later on Lavoisier named it as "nitrogen".

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From the above, it is clear that air by volume contains $\frac{1}{5}$ th of oxygen and $\frac{4}{5}$ th of nitrogen, i.e., nitrogen and oxygen are the two main gases present in air in the ratio of 4:1 by volume. The rest of the gases are present in very small amounts.

Students, You may observe air contains oxygen (an active part) and nitrogen (an inactive part), Air contains carbon dioxide and water vapour is present in air. By Activity 1, 2 and 3 which is given on page no - 89 or 90 of the notes send

Now, I will give you three a very short Questions. You will get a three minutes break to write the answers.

The Questions are :-

Q1 :- Name a main constituents of air?

Q2 :- Give the percentage composition of Oxygen in air.

Q3 :- What colour of layer was formed on the hot surface of mercury in the retort?

Students, now pause this audio for three minutes and write the answers in your chemistry notebook.

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I hope you all have written the answers by now. Let us check the answers now.

Ans1:- Nitrogen and oxygen.

Ans2:- 21%

Ans3:- Red colour of mercuric oxide.

Students, Now I am ending the lesson for today. You all are required to read the chapter again and revise the topics which we have done today.

(Thank You)