**SS 1 CHEMISTRY**

***Lesson 2***

**TOPIC: The kinetic theory of gases**

There are two types of gases, namely:

1. Ideal gases
2. Non-ideal or real gases.

An ideal gas is a gas that obeys the gas laws at all temperature and pressure.

A real gas is a gas do not obey gas laws at all temperature and pressure; the only obey gas laws at high temperature and low pressure.

The summary of the kinetic theory of gases includes the following:

1. Every gas consist of a very large number of tiny particles called molecules.
2. The molecules of a gas within a container are in a state of constant high speed in all possible directions.
3. The pressure of a gas on any surface is the result of continuous collision on the surface by its molecules.
4. The molecules of a gas exert no appreciable attraction on each other and behave as perfectly elastic body.
5. The absolute temperature of a gas is a measure of the average kinetic energy and is proportional to it.
6. There is not effect of gravity on the motion of a gas.
7. The actual volume of a gas is negligible compare with the total volume it occupies.

**VARIABLES USED FOR DISCRIBING GAS BEHAVIOURS**

1. Volume.
2. Pressure.
3. Temperature.

**VOLUME**

The volume of a gas is the size of the space it occupies, which is the capacity of it container. The SI unit of volume is the cubic metre (m3). The practical units of volume are the cubic centimetre (cm3), cubic decimetre (dm3) and the litre (L). the cubic centimetre is equivalent to millilitre (ml).

1L = 1dm3 = 1000cm3 = 1000ml.

**PRESSURE**

Pressure is defined as the total force exerted on a surface per unit area of the surface. The SI unit of pressure is to Pascal (Pa), the pressure produced when a force of one Newton is acting on an area of one square metre.

$∴1Pa=1Nm^{-2}$ (i.e. Newton per square metre).

Other units of pressure are atmosphere (atm), millimeter of mercury (mmHg).

1atm =760mmHg

$$1atm=1.01×10^{5}Nm^{-2}$$

**TEMPERATURE**

Temperature is a measure of how hot a substance is.

The SI unit of temperature is degree centigrade or Celsius (oC). another SI unit of temperature is the Kelvin (K). The starting point of Celsius scale is the freezing point of water at 0oC while the starting point of Kelvin scale is -273oC (i.e. 0K)

Charles, a French scientist, discovered that at 0oC, the volume of an ideal gas is 273m3, if the volume reduces to 272m3 (i.e. -1m3), the temperature will reduce to -1oC; when the volume reduces to 271m3 (i.e. -2m3), the temperature reduces to -2oC. That means at -273OC, the volume of the gas will reduce to 0m3 (i.e. the volume vanishes completely at -273oC).

This temperature, -273oC which is the starting point of Kelvin scale is called ***absolute zero.*** And the Kelvin temperature is called ***absolute temperature.***

0oC = 273K

-273oC = 0K (zero Kelvin)

$$∴K=℃+273$$

$℃=K-273$.