

COURSE TITLE : PHYSICAL CHEMISTRY I

COURSE CODE : 15U5CRCHE07

UNIT 1 : GASEOUS STATE

SESSION 3 : Kinetic Molecular Model of Gases

Ideal Gas

Any gas which obeys the gas laws exactly.

$$P \propto \frac{1}{V} \quad \text{at constant } T$$

$$V \propto T \quad \text{at constant } P$$

$$P \propto T \quad \text{at constant } V$$

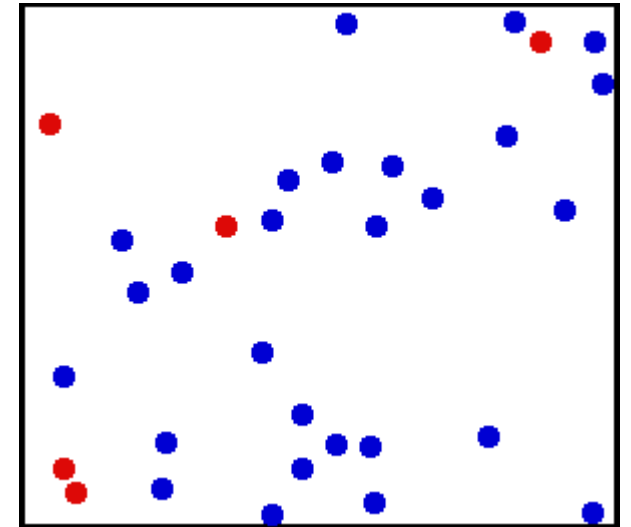
$$V \propto n \quad \text{at constant } T \text{ and } P$$

$$PV = nRT$$

Ideal Gas Equation

THE BASIC POSTULATES OF THE KINETIC THEORY

- A gas is composed of large number of very small discrete particles called 'molecules'. All molecules of a given gas are all identical but differ from those of another gas.
- The molecules are so small that their actual volume is negligible in comparison with the total volume occupied by the gas.
- The molecules within a container are in a state of constant, random, chaotic motion during which they collide with each other and with the walls of the container.



- Collisions between gas particles are completely elastic. In other words, there is no net loss or gain of kinetic energy when particles collide.
- The 'pressure' of a gas is due to the elastic bombardment of the moving molecules on the walls of the container.
- There are no forces of attraction between the molecules. Hence the particles possess no potential energy and thus their total energy is simply equal to their kinetic energies.
- The average kinetic energy is directly proportional to the absolute temperature of the gas.

