

## Assumption of Kinetic Theory of Gases.

Kinetic theory of gases relates the macroscopic properties of gases (such as pressure, temperature etc.) to the microscopic properties of the gas molecules (such as speed, momentum, kinetic energy of molecule etc.)

Actually it attempts to develop a model of the molecular behavior which should result in the observed behavior of an ideal gas. It is based on following assumptions:

- (1) Every gas consists of extremely small particles known as molecules. The molecules of a given gas are all identical but are different than those of another gas.
- (2) The molecules of a gas are identical, spherical, rigid and perfectly elastic point masses.
- (3) Their size is negligible in comparison to intermolecular distance (10<sup>-9</sup> m)
- (4) The volume of molecules is negligible in comparison to the volume of gas. (The volume of molecules is only 0.014% of the volume of the gas).
- (5) Molecules of a gas keep on moving randomly in all possible direction with all possible velocities.
- (6) The speed of gas molecules lie between zero and infinity (very high speed).
- (7) The number of molecules moving with most probable speed is maximum.
- (8) The gas molecules keep on colliding among themselves as well as with the walls of containing vessel. These collisions are perfectly elastic. (i.e. the total energy before collision = total energy after the collision).
- (9) Molecules move in a straight line with constant speeds during successive collisions.
  
- (10) The distance covered by the molecules between two successive collisions is known as free path and mean of all free paths is known as mean free path.
- (11) The time spent M a collision between two molecules is negligible in comparison to time between two successive collisions.
- (12) The number of collisions per unit volume in a gas remains constant.
- (13) No attractive or repulsive force acts between gas molecules.
- (14) Gravitational attraction among the molecules is ineffective due to extremely small masses and very high speed of molecules.

(15) Molecules constantly collide with the walls of container due to which their momentum changes. The change in momentum is transferred to the walls of the container. Consequently pressure is exerted by gas molecules on the walls of container.

(16) The density of gas is constant at all points of the container.