Gas Laws: The behaviour of gases and the relation between variables like, m, V, T, P etc are explained by certain laws known as gas laws.

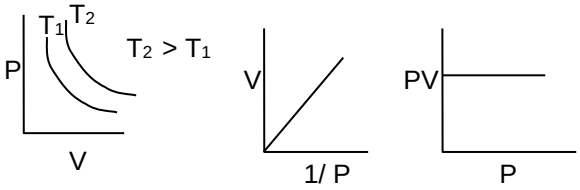
BOYLE'S LAW:

1. For a given mass of a gas at constant temperature, the volume is inversely proportional to the pressure.
2. For a given mass of a gas at constant temperature, the product of its volume and pressure is a constant value.
3. According to Boyle's law for a given mass of a gas at constant temperature the density of the gas is proportional to the pressure of it.
4. For a given mass of gas at constant temperature.

   1. $V\alpha\frac{1}{P}$ 2. $d\alpha P$

   PV = constant; d/P = constant

   3. $P_1V_1 = P_2V_2$ 4. $\frac{P_1}{d_1} = \frac{P_2}{d_2}$

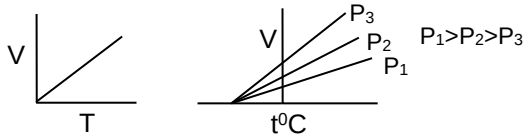


CHARLES LAW:

1. For a given mass of a gas at constant pressure, the volume of the gas is directly proportional to its absolute temperature. This is known as Charles law.
2. For a given mass of gas at constant pressure the density of the gas is inversely proportional to its absolute temperature.
3. For a given mass of gas at constant pressure.

   1) V α T 2) d $\alpha\frac{1}{T}$ 3) $\frac{V}{T}$Constant

   4)$\frac{V_1}{T_1} = \frac{V_2}{T_2}$5) dT=constant 6) $d_1T_1 = d_2T_2$



4. For a given mass of a gas at constant pressure the volume of the gas increases or decreases by 1/273th part of its volume at 0^0C for every 1^0C raise or fall in temperature

   $V_t = V_0 (1 + \alpha t)$

   V_t is volume at t^0C; V_0 is volume at 0^0C

   $\alpha = \frac{1}{273}$= 0.00366; α= 3.66×10^{-3}

   (α is volume coefficient)

AVOGADRO'S LAW:

At constant temperature and pressure, the volume of a gas is proportional to the number of moles present in it. This is known as Avogadro's law V αn, $\frac{v_1}{v_2} = \frac{n_1}{n_2}$.

18. Under similar conditions of temperature and pressure equal volumes of all gases contain equal number of moles (or) molecules.
19. Under similar conditions of temperature and pressure equal volumes of all gases contain equal number of atoms. This is known as Berzilius hypothesis.

    The Berzilius hypothesis leads to the conclusion that atoms are divisible, which is contrary to the Dalton's atomic theory and therefore it is discarded.
20. At constant temperature, for a gas having constant volume, the pressure is directly proportional to the number of moles present in it

$$P \alpha n; \frac{p_1}{p_2} = \frac{n_1}{n_2}$$