D. B. College (Jaynagar) Chemistry department

Lect. 2°

B. Sc. (I) Subsidiary

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Gaseous State

There are 11 gaseous —

H He

N O F Ne

Cl Ar

Kr

Xe

Rn

Parameters of gases :—

1. Mass :— It represented in form of no. of moles.

$$n = \frac{W}{M}$$

2. Volume :— Volume of gas = Volume of container

$1m^3 = 10^3 L = 10^3 dm^3 = 10^6 cc = 10^6 ml$

3. Pressure :— force exerted by gaseous molecules on the wall of container.

$$P = \frac{F}{A} \quad N/m^2 \text{ or } Pa$$

Temp. ↑ K.E ↑ P ↑ $T \propto P$

760 mm of Hg = 76 cm of Hg = 1 atm = 1.01325×10^5 Pa

$= 1.01325 \times 10^5$ Pa

$= 1.01325$ bar

4. Temperature :— Degree of hotness.

$T(K) = T^\circ(c) + 273.15K$

$T(^\circ F) = \frac{9}{5}\,^\circ C + 32$

Gaseous Law :—

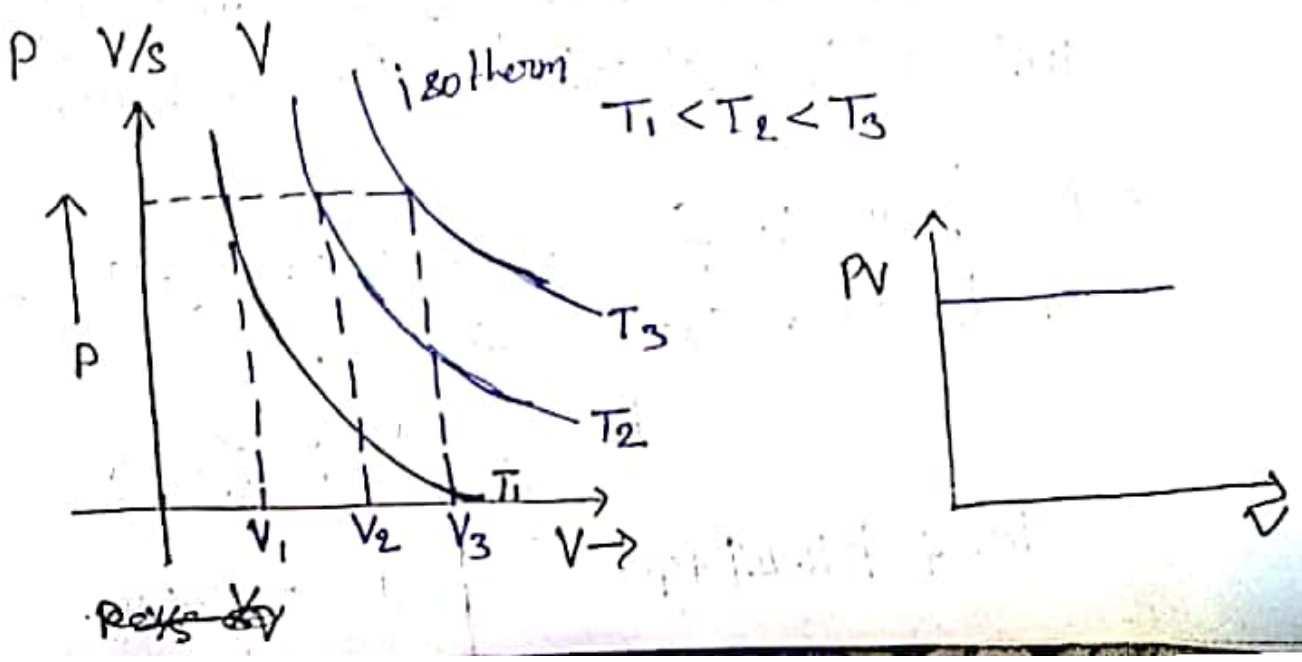
1. Boyle's Law :— At Const. temp., Pressure of a certain amount (i.e. no. of moles) of gas varies inversely with volume.

at Const n, T

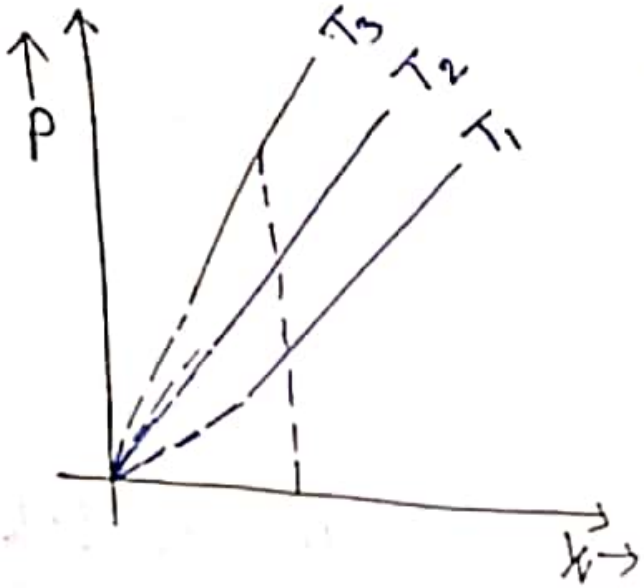
$P \propto \frac{1}{V}$

$P = \frac{K}{V}$

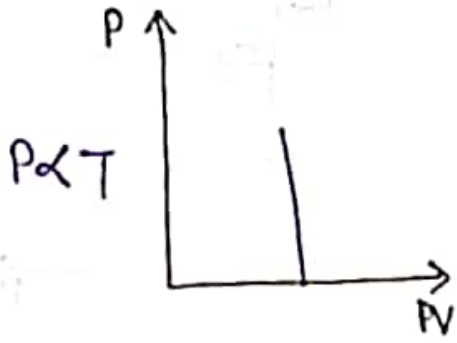
$P_1V_1 = P_2V_2 = P_3V_3 \text{ ---- } = \text{Const.}$



P V/s $\frac{1}{V}$



$T_3 > T_2 > T_1$



3. Gay-Lussac Law:— At const volume, Pressure of a fixed amt of gas varies directly with temp.

n, V = Const.

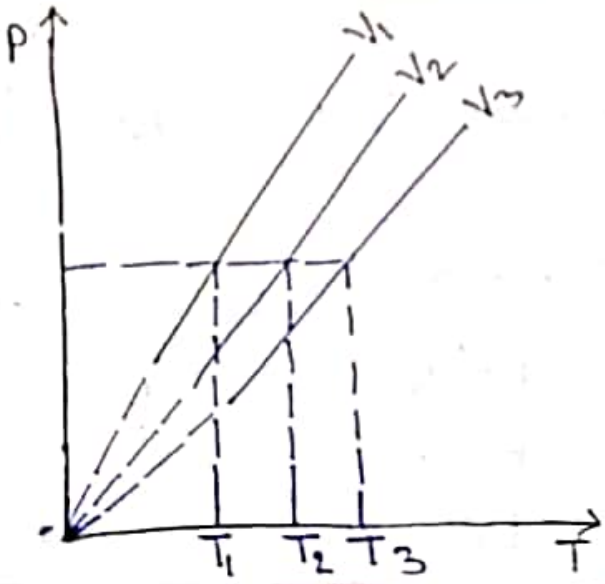
$P \propto T$

$P = KT$

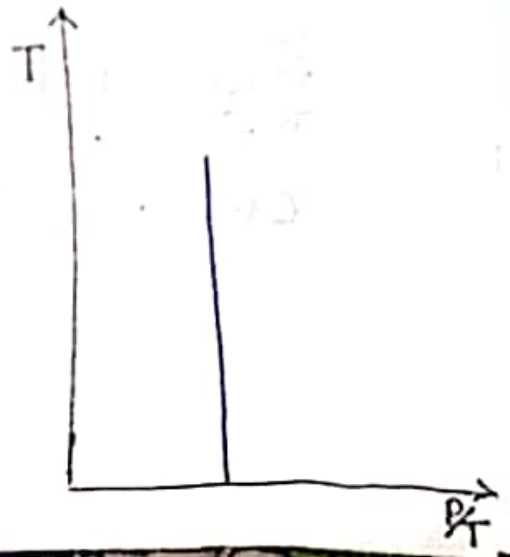
$\frac{P}{T} = K$

$\frac{P_1}{T_1} = \frac{P_2}{T_2}$

P V/s T

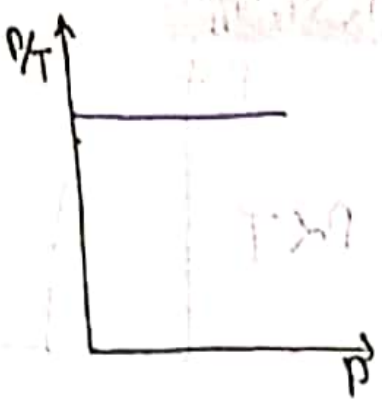


P/T V/s T



$V_1 < V_2 < V_3$

P/T V/S P



Avagadro law :- It states that equal Volume of all gases contains equal no. of moles at same temp. and Pressure..

$P, T \rightarrow$ Const.

$V \propto n$

$V = Kn$

Ideal gas Equation :-

27°C $T, n \rightarrow$ Const $P \propto \frac{1}{V}$ Boyle's Law

1 atm
Sea level atmospheric P. open Container $P, n \rightarrow$ Const. $V \propto T$ Charle's Law

Closed vessel $V, n \rightarrow$ Const. $P \propto T$ Gay Lussac's Law

$P \propto \frac{nT}{V}$

$P = \frac{nRT}{V}$

$PV = nRT$