Relation b/w P and density (d)

$PV = nRT$

$PV = \frac{m}{M}RT$

$$\boxed{PM = dRT}$$

$PM = \frac{m}{V}RT$

Q:- At 27°C Volume of gas is decreased by 50% when p is increased by 100%. then find changin Pressure is if Volume is decreased by 25%

$T \rightarrow$ const. $\quad P_1V_1 = P_2V_2$

$P_1 = P + 100\%.P$

$P_1 = 2P$

$V_1 = V - \frac{50}{100}V = V/2$

$P_2 = ?$

$\Delta P = ?$

$V_2 = V - \frac{25}{100}V$

$= 3/4\,V$

$2P \cdot V/2 = P_2\, 3/4\,V$

$P_2 = 4/3P$

$\Delta P = 4/3\,P - P = 1/3\,P$

$\% \Delta P = \frac{4/3P - P}{P} \times 100$

$= 33.33\%.$

Ques:- At 27°C Volume of gas is increased by 100%. when pressure is decreased by 50%. Find change in Volume if pressure is decreased upto 25%.

$T \rightarrow$ Const $\quad P_1V_1 = P_2V_2$

$V_1 = 2V$

$P_1 = \frac{1}{2}P$

$P_2 = \frac{25}{100}P = \frac{P}{4}$

$P_1V_1 = P_2V_2$

$\frac{1}{2}P \times 2V = \frac{P}{4} \times V_2$

$4V = \frac{4 \times 2}{2}V = V_2$

$\Delta V = 4V - V = 3V$

$\% \Delta V = \frac{4V - V}{V} \times 100$

$= \frac{3V}{V} \times 100$

$= 300\%$.

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$= \frac{3V}{V} \times 100$

$= 300\%$.

Ques:- At 27°C equal masses of H_2, O_2 & CH_4 are taken then find ratio of their volume if Pressure is Const.

Temp, P = Const

$$V \propto n$$

$$n_1 = \frac{m}{2}$$

$$V_{H_2} : V_{O_2} : V_{CH_4} :: n_{H_2} : n_{O_2} : n_{CH_4}$$

$$\frac{m}{2} : \frac{m}{32} : \frac{m}{16}$$

$$\left(1 : \frac{1}{16} : \frac{1}{8}\right) \times 16$$

$$16 : \frac{16}{16} : \frac{16}{8}$$

$$16 : 1 : 2$$

Ques:- 500ml of a gas at 27°C is cooled upto -3°C at identical Condⁿ then fixed new volume of gas?

$$P \rightarrow \text{Const}$$

$$V \propto T$$

$$\frac{V}{T} = \text{Const}$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{500}{300} = \frac{V_2}{270}$$

$$V_2 = \frac{270 \times 500}{300} = 450 \text{ ml}$$

Ques- At 1atm Pressure & 27°C density of gas is 'd' at what temp. density of gas will be 0.75d, Pressure being same?

$$PM = dRT$$

$$dT \propto \text{Const.}$$

$$d_1T_1 = d_2T_2$$

$$dX300 = 0.75dT_2$$

$$T_2 = \frac{300}{0.75} \times 100 = 400K$$

Ques- Density of Ne gas is max^m at

① STP

② 0°C, 2atm

③ 1atm, 27°C

④ 273°C, 2atm

$$PM = dRT$$

$$\frac{P}{T} \propto d$$