or, $\frac{p^\circ - p}{p^\circ} = \frac{n_1}{n_1 + n_2} = x_2$

Date 07/02/20 This is the Raoult's law.
Proof P.N. Jha.

Freezing Point of liquid (Depression of freezing Point) :-

Freezing Poin :- The F.P of a liquid is the temp. at which liquids and Solids forms of a Substance have the same V.P.

Thus, at the F.P the Solid and liquid forms co-exis's Equilibrium.

Liquid $\rightleftharpoons$ Solid.

Since upon dissolution of a Solid in a Solvent there decrease in a V.P, it follows therefore, ~~is a decrease in a~~ at when Solid is dissolve in a Solvent there will be a rease in F.P. This is called the depression of F.P.

$p^\circ - p = \Delta P =$ L. of V.P.

Similarly,

$p^\circ - p = \Delta T_f$ is called depression in F.P.

i.e., $\Delta P \propto \Delta T_f$ — (I)

ΔP is directly Proportional to (ΔT_f) the freezin of ΔT_f.

Henry's law (1805):→ The mass of gas dissolved in given volume of liquid is directely proportional to Pressure of the gas at constant Temperature in equilibrium with solution.

$$\text{mass of gas} \propto P_{gas}$$

Suppose m be the mass of gas dissolved per unit volume of a solvent and P is the pressure of the gas in equilibrium with the solution, then

$$m \propto P_{gas} \Rightarrow \boxed{m = K_H \cdot P_g}$$ where K_H is known as Henry's law constant. K_H-value depends upon the nature of the gas, solvent, Temp(T) and pressure(P)

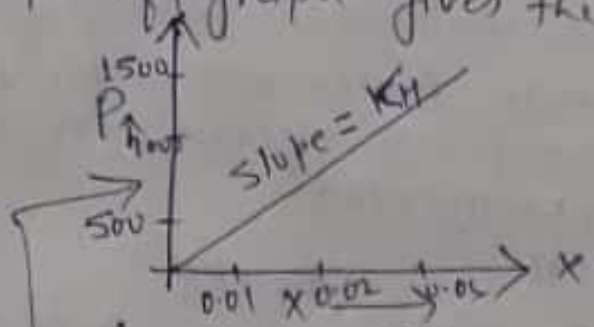
$$\text{Solubility of gas} \propto \frac{1}{K_H}$$. It means

$K_H \propto$ Temp $\propto \frac{1}{\text{solubility}}$ i.e Solubility $\propto$ pressure $\propto \frac{1}{K_H}$

$$\boxed{\text{Solubility} \propto P \propto \frac{1}{K_H} \propto \frac{1}{T}}$$

unit of K_H = Pressure unit
i.e unit of K_H = Torr or K.bar

Graphical representation of Henry's law:→ When a graph is plotted b/w Pressure and mole fraction then a straight line is obtained. the slope of graph gives the value of K_H.



Henry's law in terms of Dalton's law of partial pressure

At a given Temp. mole fraction of a gas is directely proportional to Pressure of the gas i.e pressure of gas is directely proportional to mole fraction of the gas.

$$P_{gas} \propto X_{gas} \Rightarrow \boxed{P_g = K_H \cdot X_g}$$