Nishant Jindal

O-II 1-14

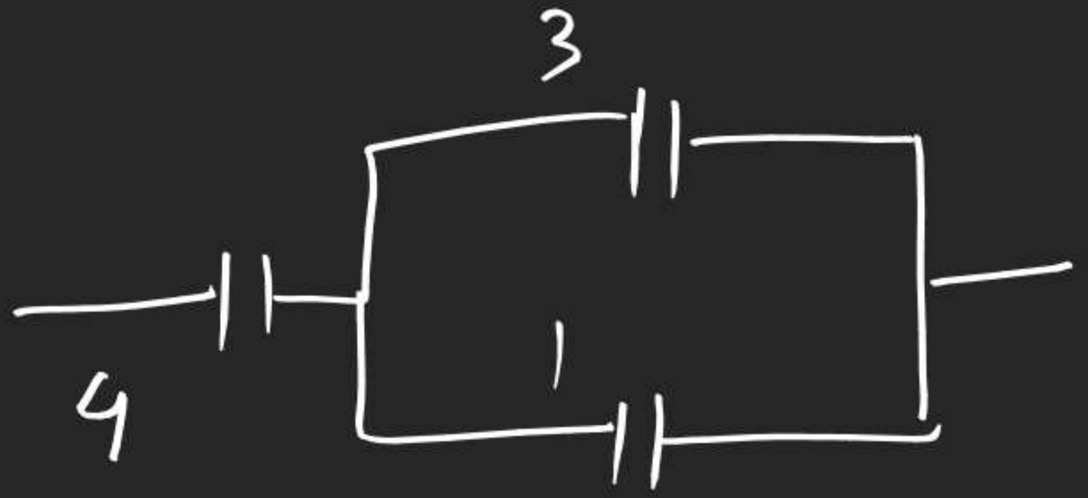
J-M 1-20

O-II

5 Cr

Ans (A, B, D)

2



3

$$\Lambda_m = 2 \times \Lambda_{eq}$$

$$\Lambda_m = 2\left(\Lambda_{eq\,Ca^{2+}} + \Lambda_{eq\,Cl^-}\right)$$

9

$$Ag \longrightarrow Ag^+ + e^-$$

$$E^\circ_{Ag,Cl^-/AgCl} = E^\circ_{Ag/Ag^+} - \frac{0.06}{n}\log\frac{K_{sp}}{[Cl^-]} \qquad [Cl^-] = 1$$

$$E^\circ_{oxid} = \cancel{E^\circ_{Ag/Ag^+}} - \frac{0.06}{1}\log K_{sp}$$

$$E^\circ_{Red} = \cancel{E^\circ_{Ag^+/Ag}}$$

$$E^\circ_{cell} = -0.06\log K_{sp}$$

$$nF\left(\frac{dE}{dT}\right) = \Delta S$$

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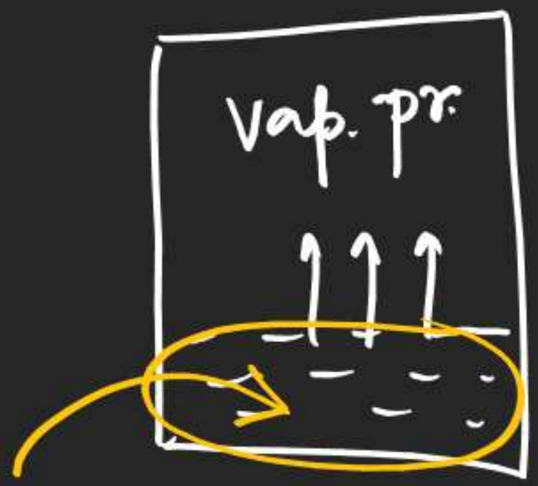
Liquid Solution

This chapter mainly deals with m.pt, b.pt & vap pr of a pure liq and its solution.

vapour pressure of pure liq

$$A(l) \longrightarrow A(g)$$



$$K_p = P_A = \text{vap pr of liq}$$

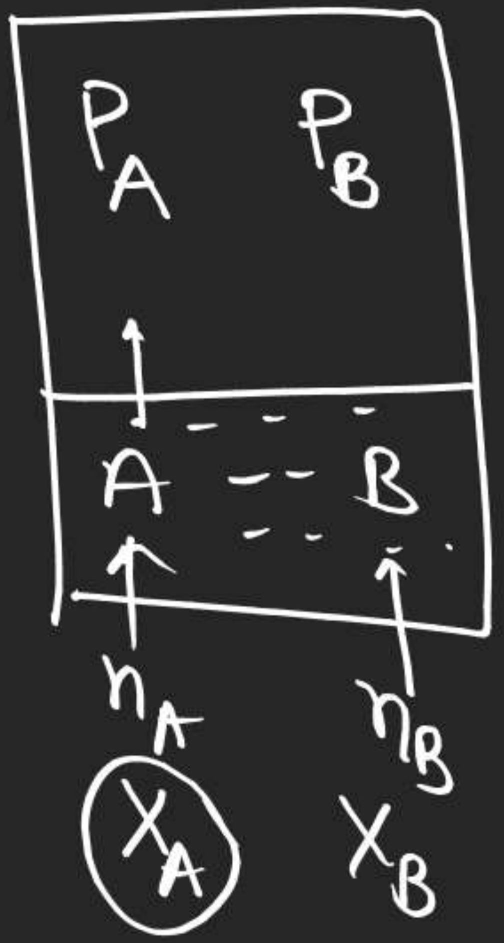
as $T \uparrow$ $K_p \uparrow$ therefore $P_A \uparrow$

$$\ln \frac{P_{T_2}}{P_{T_1}} = \frac{\Delta H}{R}\left[\frac{1}{T_1} - \frac{1}{T_2}\right]$$

$$K_p = \frac{P_A}{[A]}$$

vap pressure of a pure liq depends only on temp and is independent of size & shape of container & volume of liq present in it.

Raoult's law :→ Vapour pressure of any volatile component of a liquid solution is equal to the product of mole fraction of that component with vap. pr. of same component when it is present in pure form.



$$X_A = \frac{n_A}{n_A + n_B}$$

$$X_A + X_B = 1$$

at eqlbm

$$P_A = X_A P_A^{\circ}$$

$$P_B = X_B P_B^{\circ}$$

$$P_T = P_A + P_B$$

$$P_T = X_A P_A^{\circ} + X_B P_B^{\circ}$$

$$P_T = \frac{n_A P_A^{\circ} + n_B P_B^{\circ}}{n_A + n_B}$$

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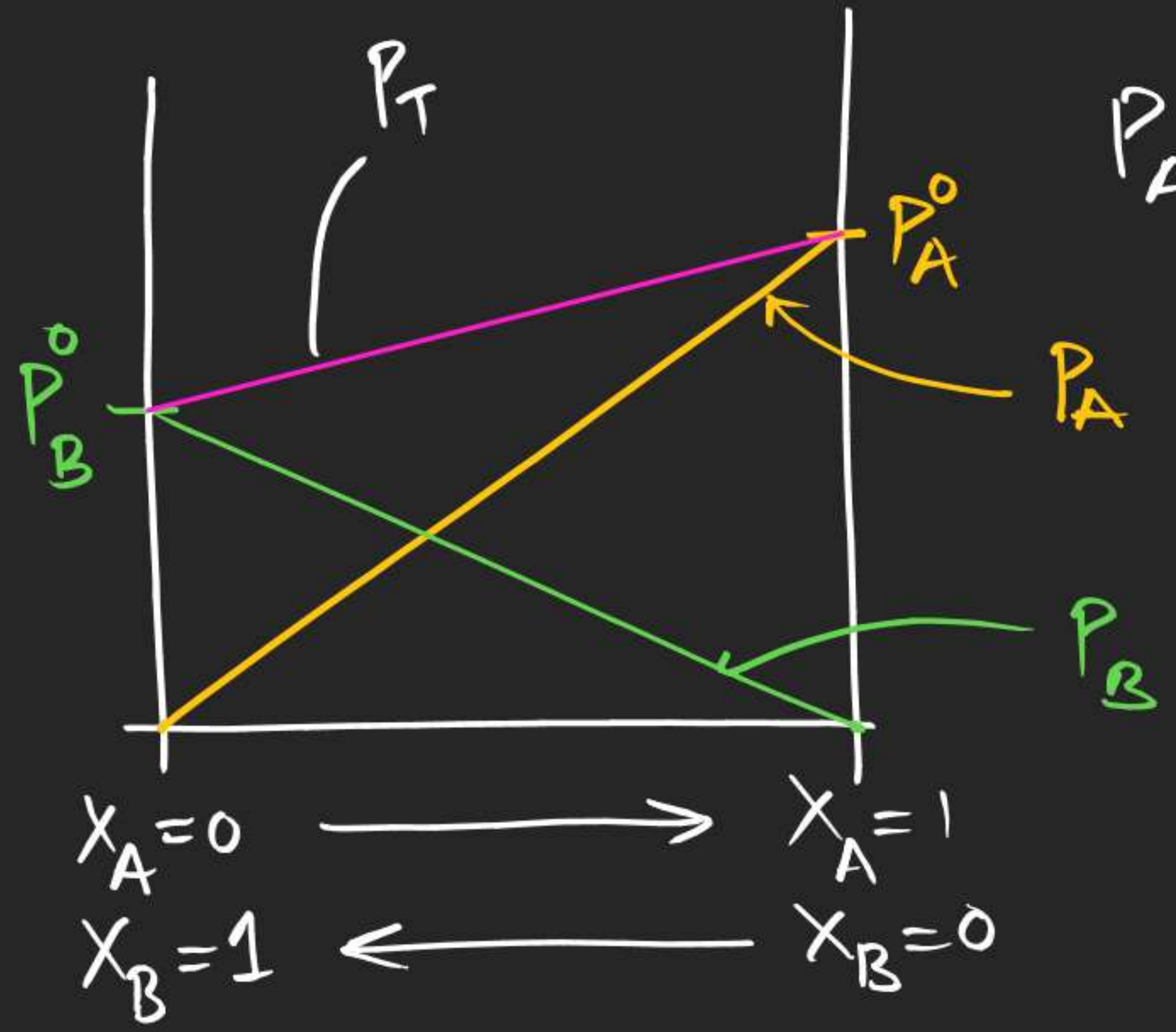
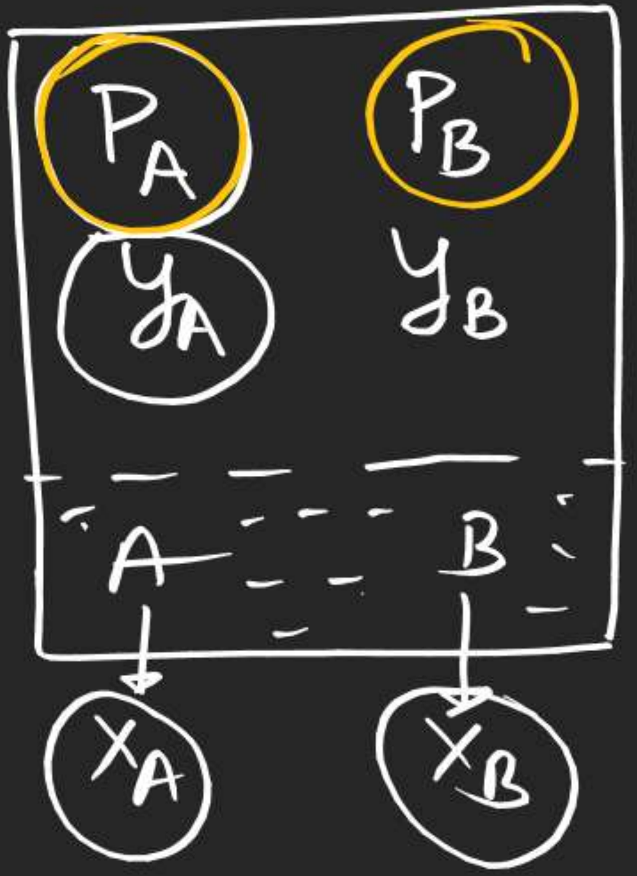


$$P_A = X_A P_A^o$$

$$P_T = X_A P_A^o + (1 - X_A) P_B^o$$

$$P_T = \underline{P_B^o} + X_A (P_A^o - P_B^o)$$

Relationship bet^n Raoult's law & Dalton's law



Acc. to Dalton's law

$$P_A = y_A P_T \qquad P_B = y_B P_T$$

Acc to Raoult's law

$$P_A = x_A P_A^{\circ} \qquad P_B = x_B P_B^{\circ}$$

$$\boxed{\begin{aligned} y_A P_T &= x_A P_A^{\circ} \\ y_B P_T &= x_B P_B^{\circ} \end{aligned}}$$

$$x_A + x_B = 1$$

$$y_A + y_B = 1$$

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Q. find y_A, y_B & P_T if 1 mol liq A is mixed with 3 mol liq B. Given $P_A^o = 20$ torr $P_B^o = 10$ torr.

$\boxed{X_A = 1/4}$ $\boxed{X_B = 3/4}$

$P_T = \frac{1 \times 20 + 3 \times 10}{4} = 12.5$

$\boxed{y_A \times 12.5 = \frac{1}{4} \times 20}$

$\boxed{y_A = 0.4}$ $\boxed{y_B = 0.6}$

$\boxed{y_B P_T = X_B P_B^o}$

$\frac{y_A}{y_B} = \frac{X_A}{X_B} \times \frac{P_A^o}{P_B^o} = \frac{1}{3} \times \frac{20}{10}$

$\frac{y_A}{y_B} = \frac{2}{3}$ $y_A = 0.4$

$y_B = 0.6$

if A is more volatile

$P_A^o > P_B^o$ $P_T < P_A^o$

$y_A P_T = X_A P_A^o$

$\boxed{y_A > X_A}$ $\boxed{y_B < X_B}$

but y_A may greater than or less than y_B

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J-Mains

J-Adv   Upto 29

Q. find P_T if $y_A = 0.5$

$P_A^0 = 30$ torr $\quad P_B^0 = 10$ torr

$$\frac{y_A P_T}{y_B P_T} = \frac{x_A P_A^0}{x_B P_B^0}$$

$$1 = \frac{0.5}{0.5} = \frac{x_A}{x_B} \times \frac{30}{10}$$

$$\frac{1}{3} = \frac{x_A}{x_B} \qquad x_A = 1/4$$

$$x_B = 3/4$$

$$P_T = \frac{30 + 30}{4} = 15$$

$$x_A + x_B = 1$$

$$\frac{y_A P_T}{P_A^0} + \frac{y_B P_T}{P_B^0} = 1$$

$$\boxed{\frac{y_A}{P_A^0} + \frac{y_B}{P_B^0} = \frac{1}{P_T}}$$