YAKEEN NEET 2.0

2026

Solutions

Physical Chemistry | **Lecture -05**

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Topics to be covered

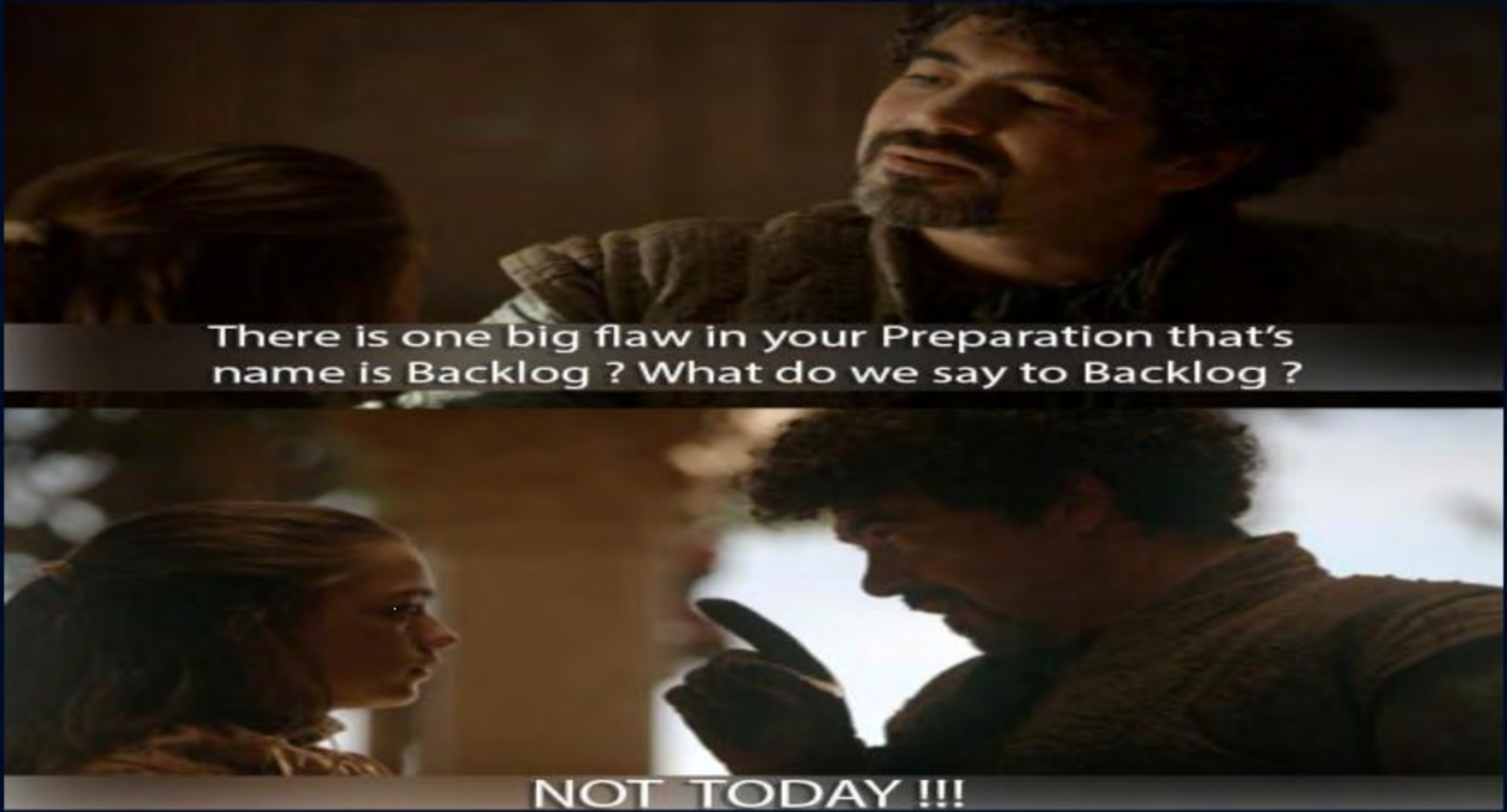
1. Revision of Last Class, Medics test
2. Non ideal solution
3. Numericals
4. Home work from modules

Rules to Attend Class

1. Always sit in a peaceful environment with headphone and be ready with your copy and pen.
2. Never ever attend a class from in between or don't join a live class in the middle of the chapter.
3. Make sure to revise the last class before attending the next class & always complete your Magarmach Practice Questions.
4. Never ever engage in chat whether live or recorded on the topic which is not being discussed in current class as by doing so u can be blocked by the admin team or your subscription can be cancelled.

Rules to Attend Class

5. Try to make maximum notes during the class if something is left then u can use the notes pdf after the class to complete the remaining class.
6. Always ask your doubts in doubt section to get answer from faculty. Before asking any doubt please check whether same doubt has been asked by someone or not.


There is one big flaw in your Preparation that's name is Backlog ? What do we say to Backlog ?
NOT TODAY !!!

MEDICS

Mastery
Checks your grasp over NEET-level concepts

Evaluation
Judging both knowledge and test-smartness

Decision Making
Testing your speed + accuracy under pressure

Intuition
Some answers need gut + logic – can you spot the trick?

Concepts
It's all about strong basics – no shortcuts here

Strategy

The MEDICS test – built for those who heal, hustle, and hope.

Q1 mole fraction of I_2 in C_6H_6 is 0.2. find Molality if $M_{C_6H_6} = 78$ g/mol

(a) 1.6
(b) 3.2
(c) 4.8
(d) None of these

$$m = \frac{x_B \times 1000}{x_A \times M_A}$$

$$m = \frac{0.\cancel{2} \times \cancel{1000}^{250}}{0.\cancel{8}_{4} \times 78} = 3.2\ m$$

Q2 which statement is/are correct?
Mixture of 64 g H_2 & 64 g O_2 is ignited to form water

$$2H_2 + 1O_2 \longrightarrow 2H_2O$$

4 moles
$4 \times 18 = 72$ g H_2O

(a) H_2 is L.R. $\frac{64}{2} = 32$ $\frac{64}{32} = 2$

(b) O_2 is L.R. $\frac{32}{2} = 16$ $\frac{2}{1} = 2$

(c) r^n mix. has 72 g H_2O & 56 g unreacted H_2.

(d) ,, ,, ,, 56 g H_2O & 72 g ~~~~~ X

n_{H_2} unreacted
$= 32 - 4 = 28$

Mass H_2 unreacted
$= 28 \times 2 = 56$ g

Q.3 which pair of Compound do not illustrate law of multiple proportions

(a) SO_2 & SO_3

(b) NO_2 & N_2O

(c) MgO & $Mg(OH)_2$

(d) NO & N_2O_5

Q.4 Which molecules represented by green colour are in lowest oxidation state?

(a) F_2O

$x - 2 = 0 \Rightarrow x = +2$

(b) H_2S

$x + 2 = 0 \Rightarrow x = -2$

(c) PH_3

$x + 3 = 0 \Rightarrow x = -3$

(d) N_2H_4.

$2x + 4 = 0$

$2x = -4$

$x = -2$.

Q5 oxid^n number of S in S_8, S_2F_2 & $Hg S$

$S_8 \rightarrow 0$

$S_2F_2 \rightarrow$

$2x - 2 = 0$

$2x = 2$

$x = +1$

HgS: -2

Test Syllabus same.

↓

Moderate & Tough.

Revision of Last class

Raoult's law

$$P_A = P_A^o x_A$$

$$P_S = P_A + P_B$$

$$P_S = P_A^o x_A + P_B^o x_B$$

Ideal solⁿ :

$$P_S = P_A^o x_A + P_B^o x_B$$

$\Delta G_{mix} = (-)ve$] spontaneous

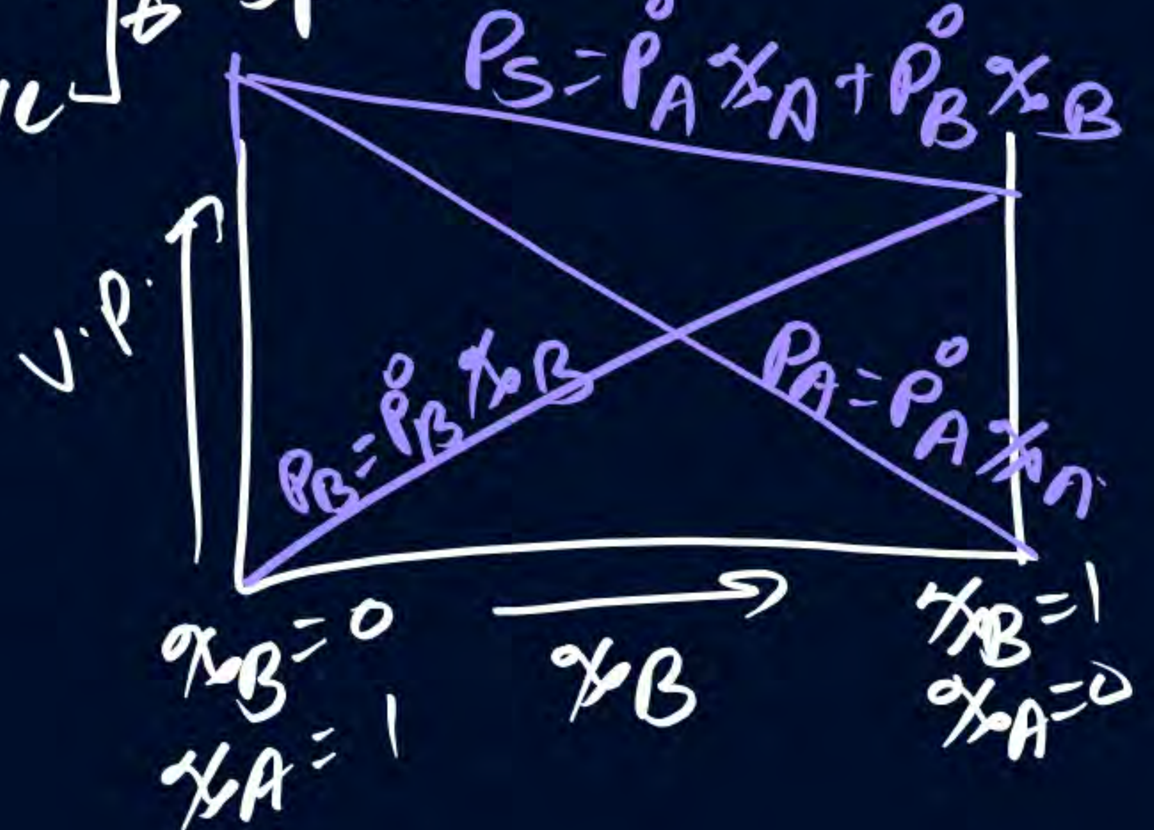
$\Delta S_{mix} = (+)ve$

$\Delta V_{mix} = 0$

$\Delta H_{mix} = 0$

$\Delta U_{mix} = 0$

$\Delta P = 0$



QUESTION

$P°A$ and $P°B$ are the vapor pressure of pure liquid components A and B respectively of an ideal binary solution. If χA represents the mole fraction of component A, the total pressure of the solution will be

(A) $p°_A + \chi_A (p°_B - p°_A)$

(B) $p°_A + \chi_A (p°_A - p°_B)$

(C) $p°_B + \chi_A (p°_B - p°_A)$

(D) $p°_B + \chi_A (p°_A - p°_B)$

$$P_S = P^0_A x_A + P^0_B (1 - x_A)$$
$$= P^0_A x_A + P^0_B - P^0_B x_A$$
$$= (P^0_A - P^0_B) x_A + P^0_B$$

QUESTION – (NEET 2019)

For an ideal solution, the correct option is:

(A) $\Delta_{mix} S = 0$ at constant T and P

(B) $\Delta_{mix} V \neq 0$ at constant T and P

(C) $\Delta_{mix} H = 0$ at constant T and P

(D) $\Delta_{mix} G = 0$ at constant T and P

QUESTION

Which one of the following is incorrect for ideal solution?

(A) $\Delta H_{mix} = 0$

(B) $\Delta U_{mix} = 0$

(C) $\Delta P = P_{obs} - P_{\text{calculated by Raoult's law}} = 0$

(D) $\Delta G_{mix} = 0$

QUESTION – (NEET 2015)

Which one is not equal to zero for an ideal solution?

(A) ΔS_{mix}

(B) ΔV_{mix}

(C) $\Delta P = P_{observed} - P_{Raoult}$

(D) ΔH_{mix}

QUESTION

Two liquids X and Y form an ideal solution. At 300 K, vapour pressure of the solution containing 1 mol of X and 3 mol of Y is 550 mm Hg. At the same temperature, if 1 mol of Y is further added to this solution, vapour pressure of the solution increases by 10 mm Hg. Vapour pressure (in mm Hg) of X and Y in their pure states will be, respectively.

(A) 200 and 300

(B) 300 and 400

(C) 400 and 600

(D) 500 and 600

$n_A = 1,\ n_B = 3$

$x_A = \frac{1}{4} \mid x_B = \frac{3}{4}$

$n_A' = 1,\ n_B' = 3+1 = 4$

$x_A' = \frac{1}{5},\ x_B' = \frac{4}{5}$

$P_S = 550$ mm of Hg. $\quad P_A^\circ = a$

$P_S' = 560$ mm of Hg. $\quad P_B^\circ = b$

$P_S = 550 = a \times \frac{1}{4} + b \times \frac{3}{4}$

$2200 = a + 3b$ ✓

$P_S' = 560 = a \times \frac{1}{5} + b \times \frac{4}{5}$

$2800 = a + 4b$ ✓

$$a + 3b = 2200$$

$$\cancel{\pm a} \pm 4b = \pm 2800$$

$$+b = +600 \text{ mm of Hg.}$$

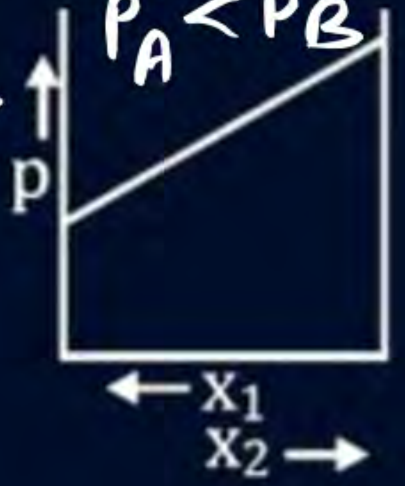
$$a + 3 \times 600 = 2200$$

$$a = 2200 - 1800 = 400 \text{ mm of Hg}$$

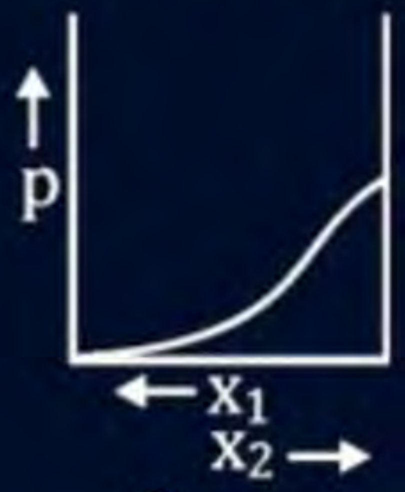
QUESTION* – (NCERT Exemplar)

For a binary ideal liquid solution, the variation in total vapour pressure versus composition of solution is given by which of the curves?

(A) $P_A^0 < P_B^0$

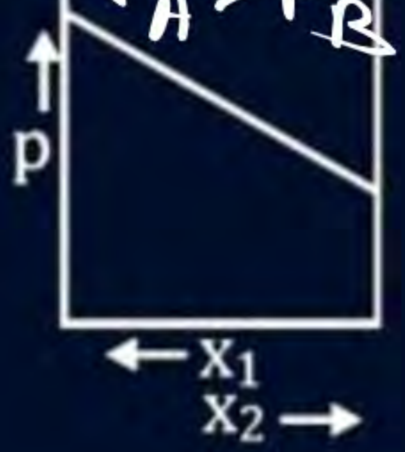


(B)



(C)

(D) $P_A^0 > P_B^0$



$$P_S = P_A^0(1-x_B) + P_B^0 x_B$$
$$= P_A^0 - \underline{P_A^0 x_B} + \underline{P_B^0 x_B}$$
$$= (P_B^0 - P_A^0)x_B + P_A^0$$

QUESTION – (AIPMT 2003)

H.W.

Formation of a solution from two components can be considered as

(i) Pure solvent → to separate solvent molecules, ΔH_1

(ii) Pure solute → to separate solute molecules, ΔH_2

(iii) Separated solvent & solute molecules → Solution, ΔH_3

Solution so formed will be ideal if

(A) $\Delta H_{soln} = \Delta H_3 - \Delta H_1 - \Delta H_2$

(B) $\Delta H_{soln} = \Delta H_1 + \Delta H_2 + \Delta H_3$

(C) $\Delta H_{soln} = \Delta H_1 + \Delta H_2 - \Delta H_3$

(D) $\Delta H_{soln} = \Delta H_1 - \Delta H_2 - \Delta H_3$

Think without Ink for Ideal Solution numerical

MIT

(1) $P_S = (P^\circ_B - P^\circ_A)\,\underline{x_B} + P^\circ_A$

B A B A

$P_S = (P^\circ_A - P^\circ_B)\,\underline{x_A} + P^\circ_B$

A B A B

molecules same

(2) if $n_A = n_B \Rightarrow x_A = x_B = \frac{1}{2}$

$P_S = \frac{P^\circ_A + P^\circ_B}{2}$

(3) if $P^\circ_A > P^\circ_B$ $\quad P^\circ_B < P_S < P^\circ_A$

(4) if $|P^\circ_A - P^\circ_B| =$ large

& $|n_A - n_B| =$ small

$\Rightarrow P_S$ nearer to higher P°

(5) if $|P^\circ_A - P^\circ_B| =$ small

& $|n_A - n_B| =$ large

$\Rightarrow P_S$ nearer to higher moles

P°

MIT

⑥ if $P^0_A > P^0_B$

then for max V.P.

$x_A = 1$ & $x_B = 0$

$P_S = \underline{P^0_A}$

or

if $P^0_B > P^0_A$

then max V.P.

$x_B = 1$ & $x_A = 0$

$P_S = P^0_B$

⑦ if $w_A = w_B = x\,g$.

L.C.M. of $\underline{M_A}$ & $\underline{M_B} = \underline{x}\,g$.

⑧ if $\underline{n_A = n_B}$

Vapours uske jyada banege jiska P^0 high hai

⑨ If $n_A = n_B$ & half of moles Vaporised

then $P_S = \sqrt{P^0_A\, P^0_B}$

L.C.M. of 20 & 40

2	20 – 40
2	10 – 20
5	5 – 10
2	1 – 2
	1 – 1

$2 \times 2 \times 5 \times 2 = 40$

QUESTION – (AIPMT 2012)

P_A and P_B are the vapour pressure of pure liquid components, A and B respectively of an ideal binary solution. If X_A represents the mole fraction of component A, the total pressure of the solution will be:

(A) $p_A + x_A (p_B - p_A)$

(B) $p_A + x_A (p_A - p_B)$

(C) $p_B + x_A (p_B - p_A)$

(D) $p_B + x_A (p_A - p_B)$

QUESTION

If $P_A^o = 200$ mm of Hg, $P_B^o = 300$ mm of Hg and Which of these cannot be P_S for two miscible liquids following ideal behaviour?

$$P_A^o < P_S < P_B^o$$

(A) 230 mm of Hg

(B) 270 mm of Hg

(C) 150 mm of Hg

(D) Cannot be solved

QUESTION – (AIIMS 2013)

120 150 180 48 + 108

At a particular temperature, the vapour pressure of two liquids A and B are respectively 120 and 180 mm of mercury. If 2 moles of A and 3 moles of B are mixed to form an ideal solution, the vapour pressure of the solution at the same temperature will be: (in mm of mercury)

(A) 156

(B) 145

(C) 150

(D) 108

$n_A = 2, \; n_B = 3 \qquad x_A = \frac{2}{5}, \; x_B = \frac{3}{5}$

$P_A^0 = 120, \; P_B^0 = 180$

$P_S = \cancel{120}^{24} \times \frac{2}{\cancel{5}} + \cancel{180}^{36} \times \frac{3}{\cancel{5}}$

$= 48 + 108 = 156$

QUESTION – (NEET 2021)

350

The correct option for the value of vapour pressure of a solution at 45°C with benzene to octane in molar ratio 3 : 2 is:

[At 45°C vapour pressure of benzene is 280 mm Hg and that of octane is 420 mm Hg. Assume Ideal gas]

(A) 168 mm of Hg ✗

(B) 336 mm of Hg ✓

(C) 350 mm of Hg

(D) 160 mm of Hg ✗

$n_B = 3,\ n_O = 2$

$\chi_B = \frac{3}{5}$ | $\chi_O = \frac{2}{5}$

$P^0_B = 280$ | $P^0_O = 420$

$P_S = 280 \times \frac{3}{5} + 420 \times \frac{2}{5}$

$= 336$ mm of Hg

QUESTION – (NEET 2016-I)

Y_A & Y_B

$n_A = n_B = 1$

Which of the following statements about the composition of the vapour over an ideal 1 : 1 molar mixture of benzene and toluene is correct? Assume that the temperature is at 25°C.
(Given, vapour pressure data at 25°C, benzene = 12.8 kPa, toluene = 3.85 kPa)

$$Y_A = \frac{P_A^0 x_A}{P_S}$$

$$Y_B = \frac{P_B^0 x_B}{P_S}$$

(A) The vapour will contain equal amounts of benzene and toluene.

(B) Not enough information is given to make a prediction.

(C) The vapour will contain a higher percentage of benzene.

(D) The vapour will contain a higher percentage of toluene.

QUESTION

If $P_A^0 = 200$ mm of Hg, $P_B^0 = 300$ mm of Hg and Which of these cannot be P_S for two miscible liquids following ideal behaviour?

(A) 200 mm of Hg

(B) 250 mm of Hg

(C) 240 mm of Hg

(D) 700 mm of Hg

QUESTION

P_A = Partial P of A = ? P_S = ?

P_B = ~~~~~~ B = ? $M_A = 20\ g/mol$, $M_B = 40\ g/mol$

A and B form a ideal solution and V.P. of pure A and B are 160 mm of Hg and 60 mm of Hg. Calculate partial pressure of ~~benzene~~ A and ~~toluene~~ B and total pressure also

$P^0_A = 160$ mm of Hg, $P^0_B = 60$ mm of Hg

(A) Containing equal mass of both A and B $\Rightarrow w_A = w_B = 40g$,

(B) Containing equal molecules of both A and B

(C) Containing 1 mole of A and 4 moles of B

(D) Also calculate mole fraction of A and B in vapour phase if equal moles of A and B mixed

$n_A = \frac{40}{20} = 2$, $n_B = \frac{40}{40} = 1$

$x_A = \frac{2}{3}$, $x_B = \frac{1}{3}$

$P_A = 160 \times \frac{2}{3} = \frac{320}{3}$

$P_B = 60 \times \frac{1}{3} = 20$

$P_S = \frac{320}{3} + 20$

(B) $n_A = n_B \Rightarrow x_A = x_B$

$$P_S = \frac{P^0_A + P^0_B}{2} = \frac{160 + 60}{2} = 110 \text{ mm of Hg}$$

(C) $n_A = 1$

$n_B = 4$

$x_A = \frac{1}{5}$

$x_B = \frac{4}{5}$

$$P_S = \cancel{160}^{32} \times \frac{1}{\cancel{5}} + \cancel{60}^{12} \times \frac{4}{\cancel{5}}$$

$$= 32 + 48$$

$$= 80\,mm\,of\,Hg.$$

(D) $n_A = n_B$

$$Y_A = \frac{P_A^{\circ} x_A}{P_S} = \frac{160 \times \frac{1}{2}}{1\cancel{0}\cancel{0}} = \frac{80}{1\cancel{1}\cancel{0}} = \frac{16}{22} = \frac{8}{11}$$

$$Y_B = 1 - \frac{8}{11} = \frac{3}{11}$$

QUESTION

At a given temperature, the vapor pressure in mm of Hg of a solution of two volatile liquids A and B is given by equation

$P = 120 - 80\chi_B$ Calculate V.P. of pure A and B at same temperature

$P = \underline{-80}\, x_B + 120$ $\quad P^0_A = 120$ mm of Hg

$= \underline{(P^0_B - P^0_A)}\, x_B + P^0_A$ $\quad P^0_B =$

$P^0_B - P^0_A = -80$

$P^0_B - 120 = -80$

$P^0_B = 120 - 80 = 40$ mm of Hg

QUESTION

If $P_A^o = 200$ mm of Hg, $P_B^o = 300$ mm of Hg and solution both have same mass and $M_A = 20$ g and $M_B = 200$ g. Find vapour pressure of solution.

(A) 325 mm of Hg

(B) 146.35 mm of Hg

(C) 209 mm of Hg

(D) 285 mm of Hg

200 g

$n_A = \frac{200}{20} = 10$

$n_B = \frac{200}{200} = 1$

$P_S = 200 \times \frac{10}{11} + 300 \times \frac{1}{11}$

QUESTION

If $P_A^0 = 100$ mm of Hg, $P_B^0 = 500$ mm of Hg and have same no. of moles in solution. Find vapor pressure of solution.

(A) 100 mm of Hg

(B) 150 mm of Hg

(C) 300 mm of Hg

(D) 500 mm of Hg

QUESTION (8th April, 1st shift-2019)

$\frac{200}{500} = \frac{2}{5} = 0.4$

The vapour pressures of pure liquids A and B are 400 and 600 mm Hg, respectively at 298 K. On mixing the two liquids, the sum of their initial volumes is equal to the volume of the final mixture. The mole fraction of liquid B is 0.5 in the mixture. The vapour pressure of the final solution, the mole fractions of components A and B in vapour phase, respectively are:

(A) 450 mm Hg, 0.5, 0.5

(B) 450 mm Hg, 0.4, 0.6

(C) 500 mm Hg, 0.5, 0.5

(D) 500 mm Hg, 0.4, 0.6

$P_A = P_A^0 x_A$

$= 400 \times \frac{1}{2}$

$P_B = 600 \times \frac{1}{2}$

$P_S = 200 + 300 = 500$

$P_S = \frac{400+600}{2} = 500$

$Y_A = \frac{400 \times \frac{1}{2}}{500} = \frac{200}{500} = \frac{2}{5} = 0.4$

$Y_B = 1 - Y_A = 0.6$

QUESTION

Find Mole Fraction of A and B if V.P. of solution is 160 torr. If V.P. of pure A and B are 100 mm of Hg and 200 mm of Hg.

$P_S = 160$ torr

$P_A^0 = 100$ mm of Hg

$P_B^0 = 200$ mm of Hg

$P_S = P_A^0 x_A + P_B^0 x_B$

$160 = 100(1 - x_B) + 200 x_B$

$160 = 100 - 100 x_B + 200 x_B$

$60 = 100 x_B$

$160 = (200 - 100) x_B + 100$

$160 - 100 = 60 = 100 x_B$

$x_B = \frac{60}{100} = \frac{3}{5}$

$x_A = \frac{2}{5}$

QUESTION

If in a solution 1 mole each of A and B are mixed. Find vapour pressure of solution if half of the total moles are vaporised (P_A^o = 500 mm of Hg and P_B^o = 20 mm of Hg)

$$P_S = \sqrt{P_A^o P_B^o}$$

$$= \sqrt{500 \times 20}$$

$$= \sqrt{10000}$$

$$= 100 \text{ mm of Hg}$$

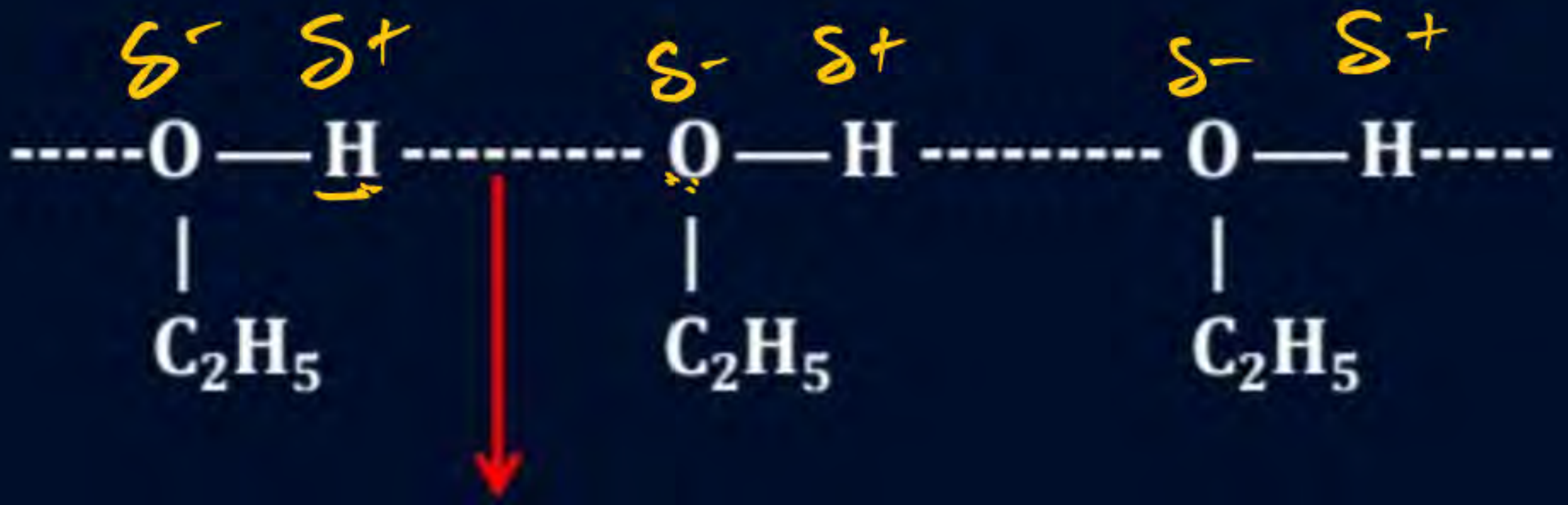
Don't attempt today's dpp

$\downarrow$

Do it tomorrow.

H-Bonding

Strong force of attraction between H & F, O, N



Intermolecular H-Bonding

Home work from modules

Solve all questions of Ideal Solution.

THANK YOU