YAKEEN NEET 2.0

2026

Solutions

Physical Chemistry | Lecture -04

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Topics to be covered

1. Revision of Last Class, Medics test
2. Raoults law
3. Ideal solution
4. Magarmach Practice questions, 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 !!!

Join Telegram group to get answers of MPQ

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.

QUESTION

The equivalent weight of potash alum ($K_2SO_4.Al_2(SO_4)_3.24H_2O$) is

A M

B $\frac{M}{2}$

C $\frac{M}{6}$

D $\frac{M}{8}$

$K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O \longrightarrow 2K^+ + 4SO_4^{2-} + 2Al^{3+}$

$E = \frac{M}{8}$

QUESTION

Match the reactions given in column I with their respective oxidant/reductant given in column II.

	Column-I Reaction and substance acting as oxidant or reductant		Column-II Oxidant and reductant
(A)	$3\overset{0}{I_2} + 6NaOH \rightarrow \overset{+5}{NaIO_3} + 5\overset{-1}{NaI} + 3H_2O$ (I_2 acts as) A → r	(p)	None act as oxidant or reductant
(B)	$BaCl_2 + Na_2SO_4 \rightarrow BaSO_4$ and $2NaCl$ $BaCl_2$ acts as B → p	(q)	Reductant
(C)	$\overset{+3}{AlCl_3} + 3Na \rightarrow 3NaCl + \overset{0}{Al}$ $AlCl_3$ acts as C → s	(r)	Both act as oxidant and reductant
(D)	$SO_2 + 2\overset{-2}{H_2S} \rightarrow 3\overset{0}{S} + H_2O$ H_2S acts as D → q	(s)	Oxidant

QUESTION

The equivalent weight of H_2SO_4 in the following reaction is

$$Na_2\overset{+6}{Cr_2}O_7 + 3SO_2 + H_2SO_4 \longrightarrow Na_2SO_4 + \overset{+3}{Cr_2}(SO_4)_3 + H_2O$$

(A) 98

(B) $\frac{98}{6}$

(C) $\frac{98}{2}$

(D) $\frac{98}{8}$

$n_f = 2$

$E = \frac{98}{2}$

Oxidation

QUESTION

↑ Metal O.N. ko bracket & roman numeral main. likhenge.

Using stock notation, represent the following compounds:

a. $HAuCl_4$ Au(III)

b. Tl_2O Tl(I)

c. $\overset{+2}{FeO}$ Fe(II)O

d. Fe_2O_3 Fe(III)

e. CuI Cu(I)

f. $\overset{+2}{CuO}$ Cu(II)O

g. MnO

Mn(II)

h. $\overset{+4}{MnO_2}$

Mn(IV)O_2

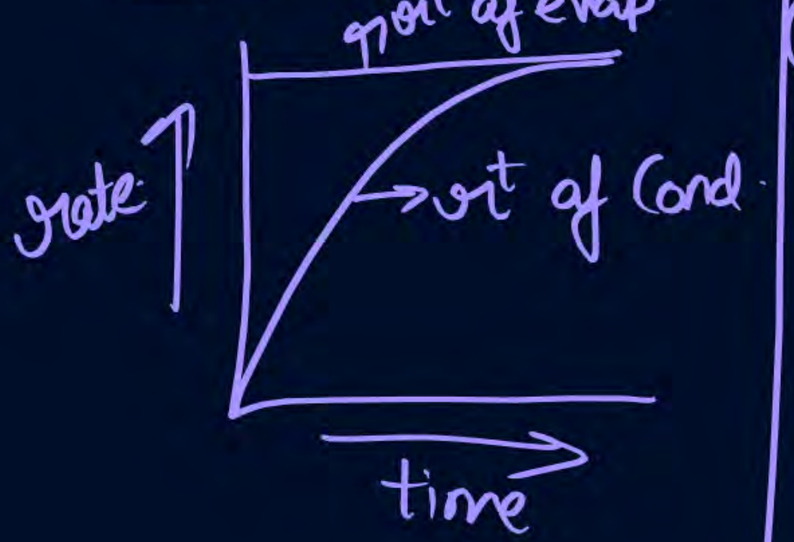
MEDICS test no :- 8

Some basic Concepts of Chemistry
+
Redox reactions

→ Complete.
Easy & moderate.

Revision of Last class

Vapour pressure



Factors

① Temp.

V.P. ↑ T ↑

V.P. ↓ T ↓

$P = K e^{-\frac{\Delta H}{RT}}$

$\log P = \log K - \frac{\Delta H}{RT}$

Clausius Clapeyron eq^n

$\log \frac{P_2}{P_1} = \frac{\Delta H}{2.303R}\left(\frac{T_2 - T_1}{T_1 \times T_2}\right)$

② $IMF \propto \frac{1}{V.P.}$

③ addition of n.v.s

n.v.s ↑ surface area occupy n.v.s V.P ↓

QUESTION (NEET)

An aqueous solution is 1 molal in KI which of the following will increase the vapor pressure?

1 mole KI in 1 Kg H_2O

(A) Addition of NaCl → n.v.s.↑ V.P.↓ (n.v.s.↓)

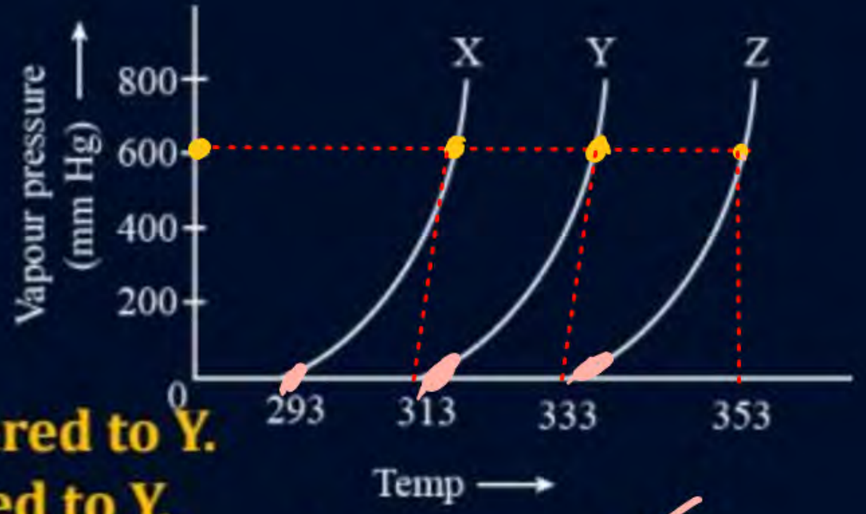
(B) Addition of Na_2SO_4 → n.v.s.↑ V.P.↓

(C) Addition of 1 molal KI → n.v.s.↑ V.P.↓

(D) Addition of water → Volatile solvent ⇒ V.P.↑

QUESTION (Jee Mains 8th Jan, 1st shift-2020)

A graph of vapour pressure and temperature for three different liquids X, Y and Z is shown below:



The following inferences are made

(A) X has highest intermolecular interactions compared to Y.

(B) X has lower intermolecular interactions compared to Y.

(C) Z has lower intermolecular interactions compared to Y.

The correct inference(s) is/are:

X < Y < Z

IMF ↑

A (C)

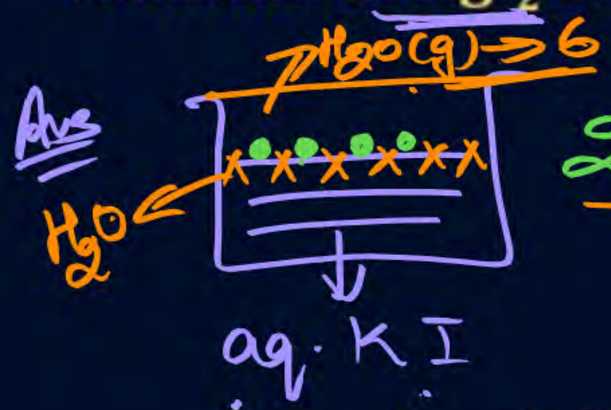
B (A)

C (B)

D (A) and (C)

QUESTION

Addition of HgI_2 to KI shows increase in vapor pressure, why?



Ans

$2KI \rightarrow 2K^+ + 2I^-$

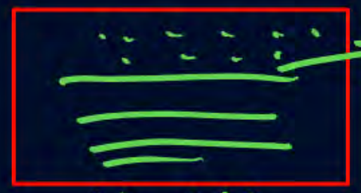
$2KI + HgI_2 \rightarrow K_2[HgI_4] \rightarrow 2K^+ + [HgI_4]^{2-}$

Nessler reagent

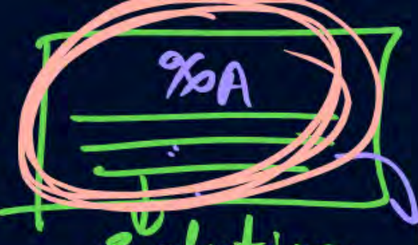
3 particles.

On addition of HgI_2, it forms $K_2[HgI_4]$ ∴ particles ↑ ⇒ V.P. ↓ ⇒ surface ↓

Raoult's Law



$\rightarrow P_A^\circ$ + NaCl $\rightarrow$



V.P. of any Component in solution is equal to Product of V.P. of that Component in pure form & it's mole fraction in solution

P_A = V.P. of A in solution

$P_A = P_A^\circ \%_A$

$P_S = P_A + P_B$

P_B = V.P. of B in solution

$P_B = P_B^\circ \%_B$

Me: Bhai yaar purey paper mei Raoult's law he puchna chahiye 50 Marks keliye

Raoult's law to me:

Raoult's Law for Volatile Solute

Volatile solvent (A)

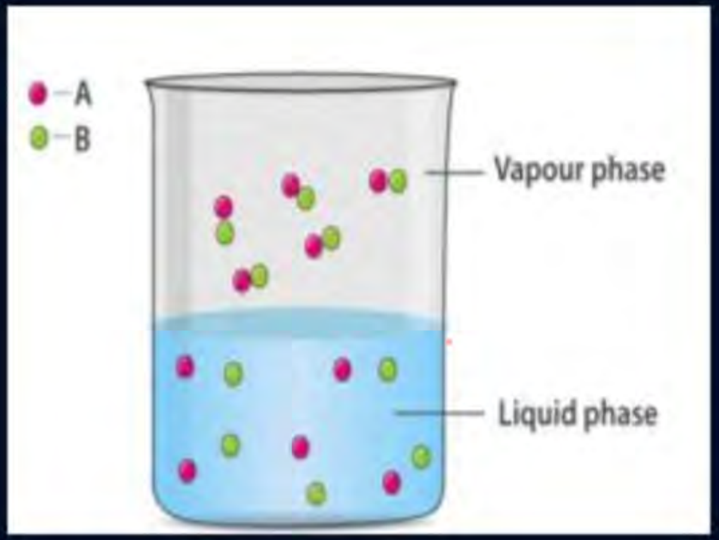
$P_A^\circ \neq 0$

+

Solute (B) Volatile

$P_B^\circ \neq 0$

=



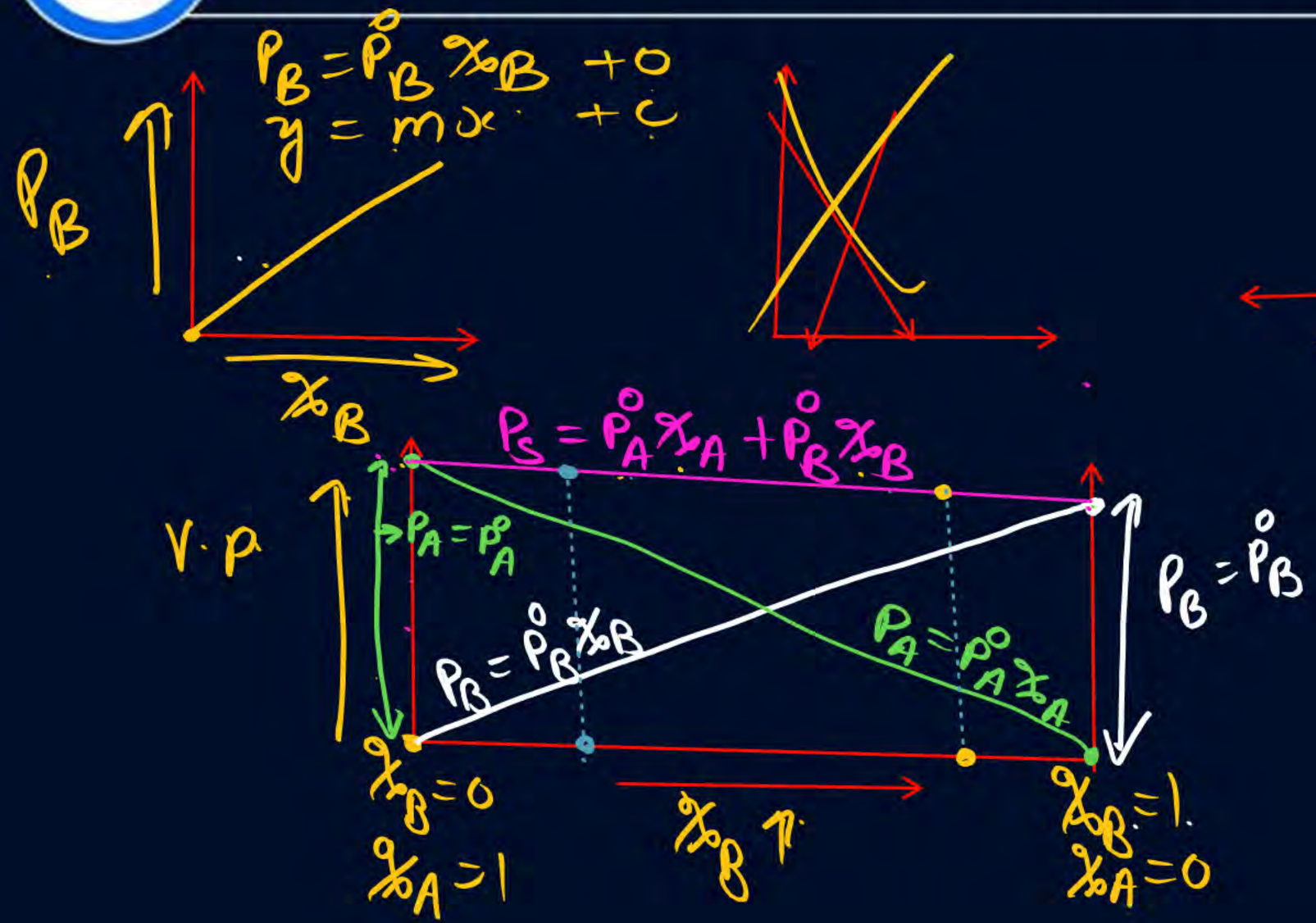
Solution

$P_A = P_A^\circ \chi_A$

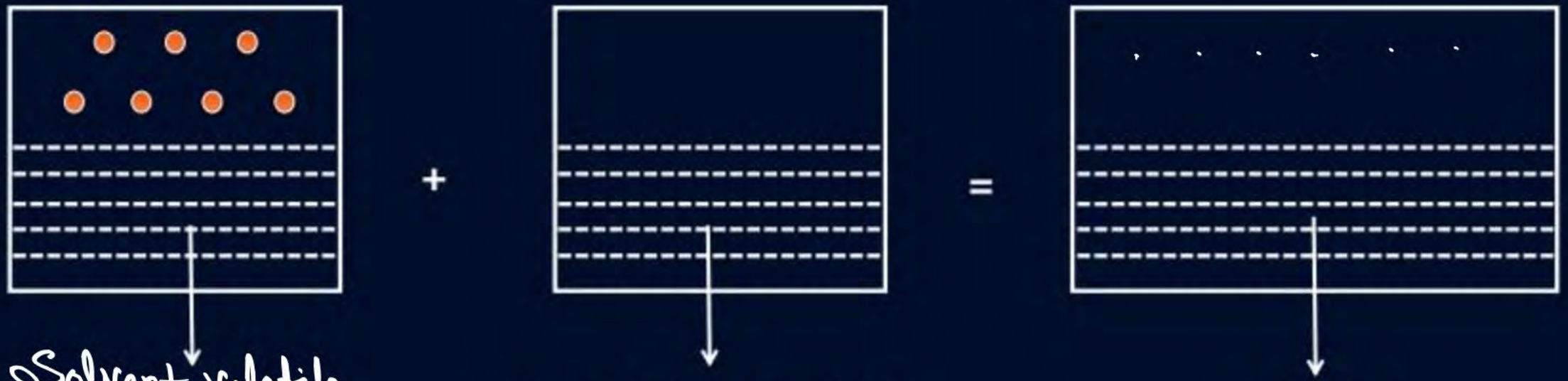
$P_B = P_B^\circ \chi_B$

$P_S = P_A + P_B$

Graphical Representation of Raoult's Law



Raoult's Law for Non-volatile Solute



Solvent volatile

$P_A^\circ \neq 0$

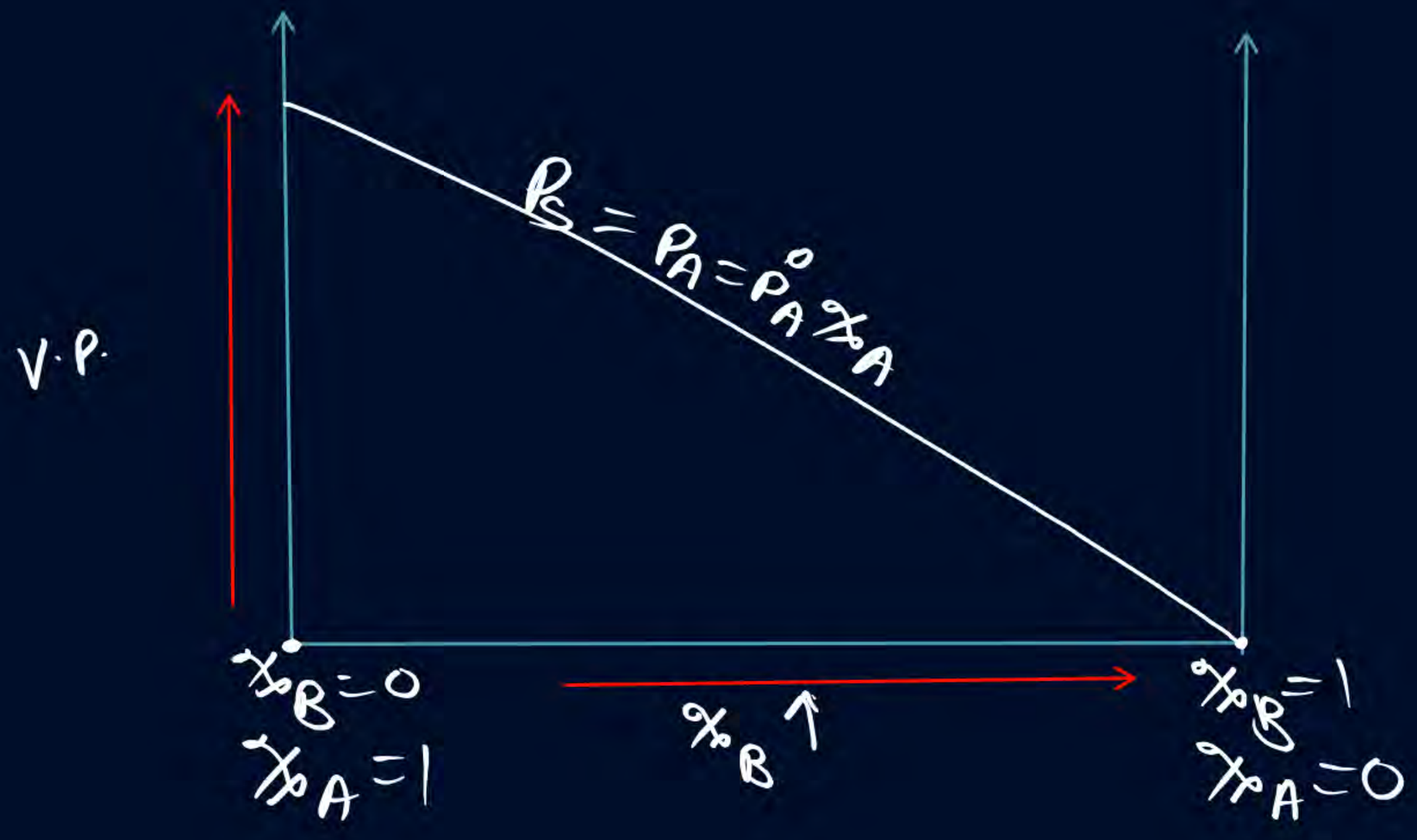
Non-Volatile Solute

$P_B^\circ = 0$

Solution

$$P_S = P_A^\circ \chi_A + P_B^\circ \chi_B$$

$P_S = P_A^\circ \chi_A$ | $P_B^\circ = 0$


V.P.
$P_S = P_A = P_A^\circ \chi_A$
$\chi_B = 0$
$\chi_A = 1$
$\chi_B \uparrow$
$\chi_B = 1$
$\chi_A = 0$

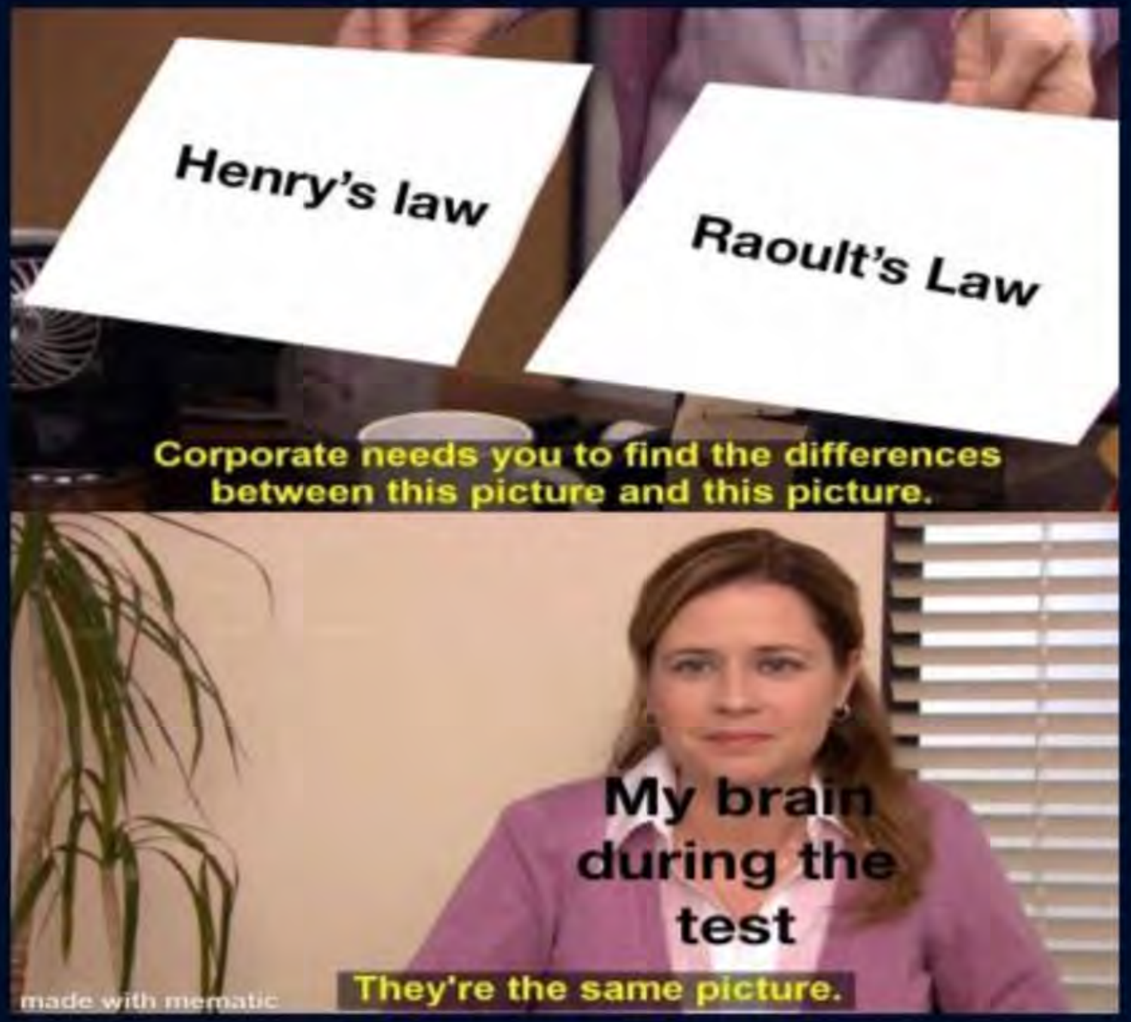
Raoult's Law as special Case of Henry's Law

Raoult's law

$P_A = P_A^\circ \times_A$

Henry's law

$P_A = K_H \times_A$



QUESTION

If Roult's law is obeyed, the vapour pressure of the solvent in a solution is directly proportional to

$P_A \propto \chi_A$

$P_A = P_A^\circ \chi_A$

A. Mole fraction of the solvent

B. Mole fraction of the solute

C. Mole fraction of the solvent and solute

D. The volume of the solution

QUESTION

If Roult's law becomes a special case of Henry's law in which K_H (Henry's constant) is equal to

$$P_A = P_A^\circ x_A$$

$$P_A = K_H x_A$$

$$K_H = P_A^\circ$$

A. Mole fraction of solvent

B. Vapour pressure of solution

C. Vapour pressure of solute ✓

D. Mole fraction of solute and solvent

Mole Fraction of Substance in Vapor Phase

Dalto's law of Partial Pressure

$P_A = Y_A P_S$ $\quad Y_A = \chi_A$

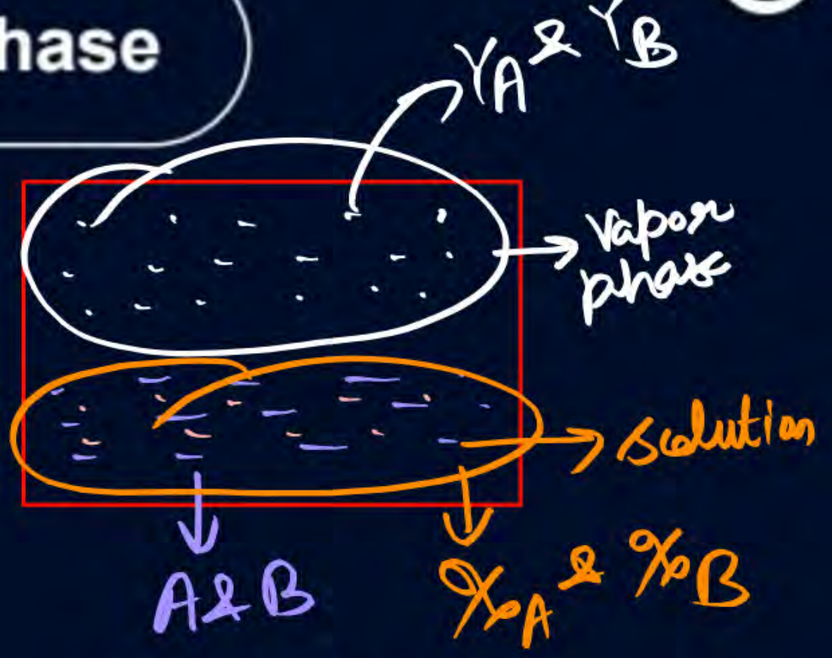
$P_S = P_T$ = V.P. of solution.

#MIT

$$Y_A = \frac{P_A}{P_S} \qquad \frac{Y_A}{Y_B} = \frac{P_A}{P_B}$$

$$Y_B = \frac{P_B}{P_S}$$

$$Y_A + Y_B = 1$$



$$\frac{P_A}{P_S} + \frac{P_B}{P_S} = 1$$

$$\frac{P_A + P_B}{P_S} = 1$$

$$\frac{P_S}{P_S} = 1$$

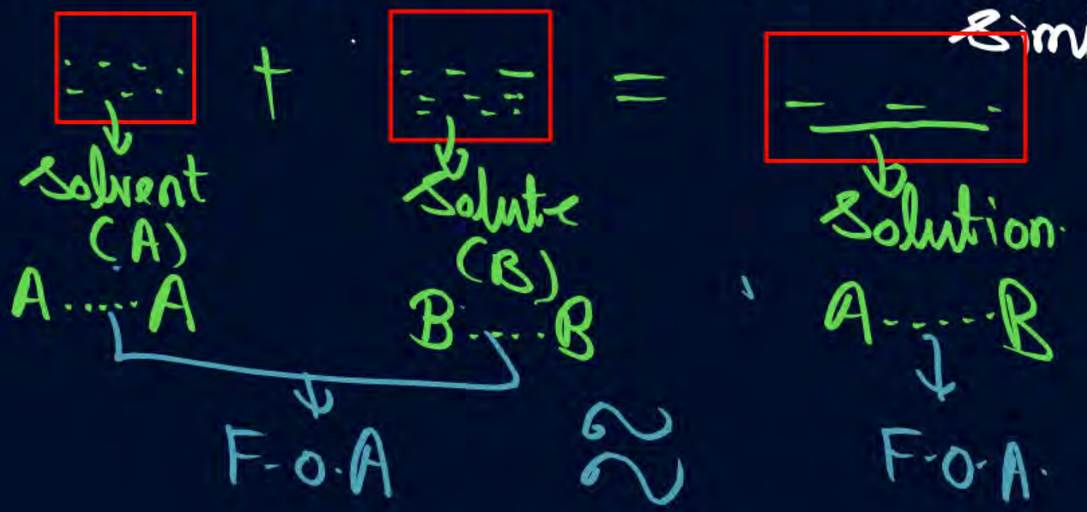
Ideal Solution

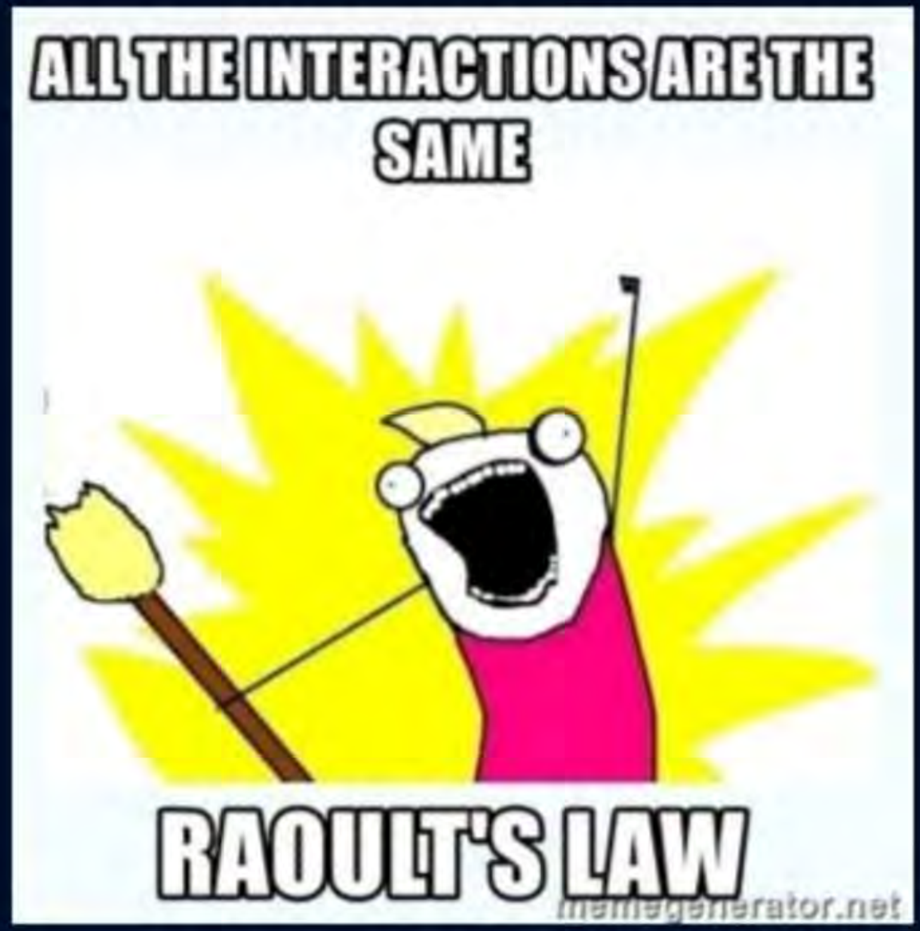
① obey Raoult's all at all conditions

$$P_S = P_A + P_B$$

or

② Solvent, solute & solution interaction similar





MIT

① $P_S = P_A^\circ x_A + P_B^\circ x_B$

② $\Delta G_{mixing} = (-)ve$] → spontaneous s^n

③ $\Delta S_{mixing} = (+)ve$]

④ $\Delta V_{mixing} = 0$ ($V_{solution} = V_{solvent} + V_{solute}$)

⑤ $\Delta H_{mixing} = 0$

⑥ $\Delta U_{mixing} = 0$

⑦ $\Delta P = P_{observed} - P_{(Calculated)\ Raoult's\ law} = 0$

$P_{observed}$ ↓ To V.P aaya hai

$P_{(Calculated)\ Raoult's\ law}$ ↓ jo Raoult's law aayega

⑧ examples → same homologous series

G = gibb's free energy ✓

S = entropy ✓

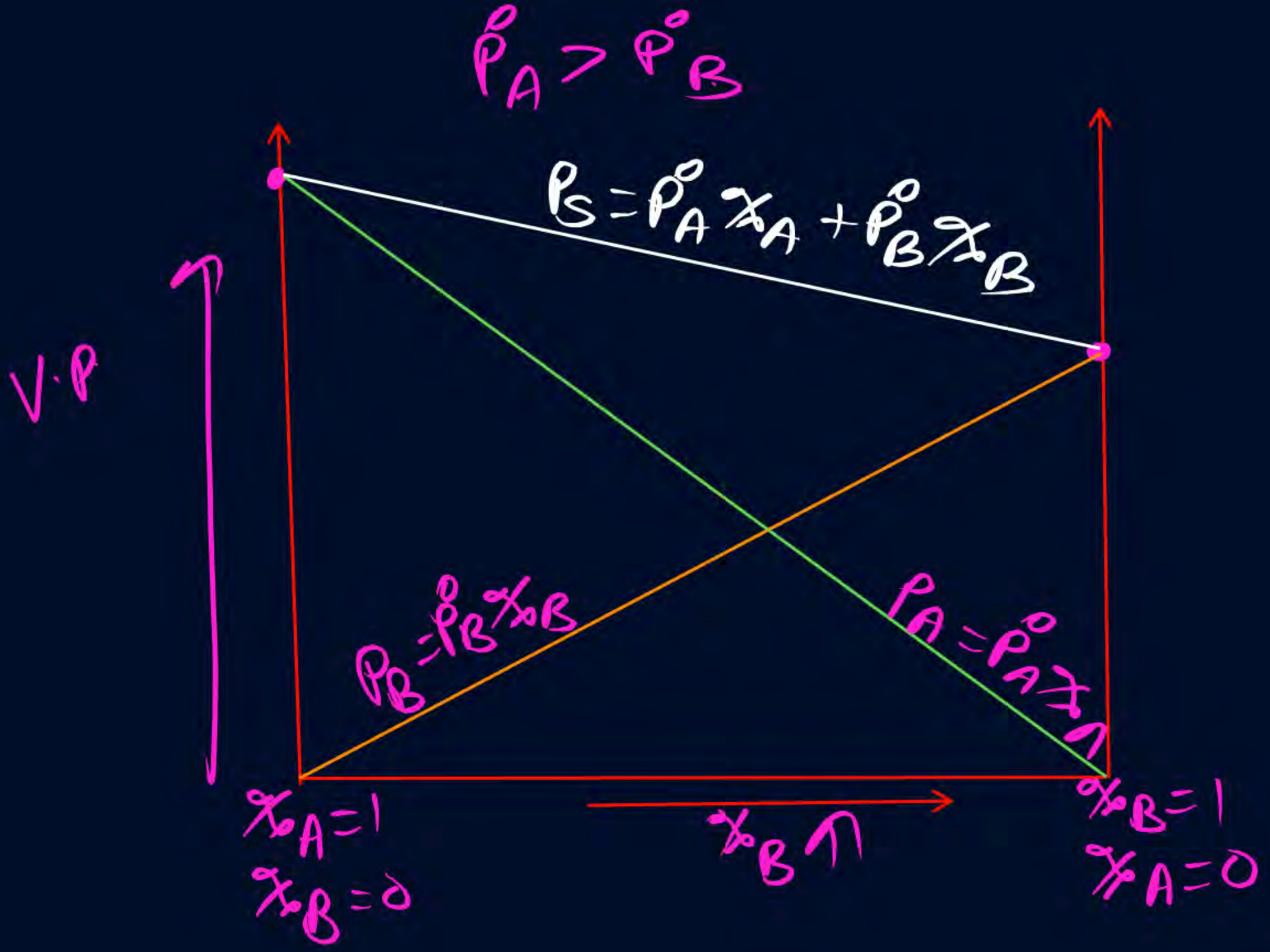
H = enthalpy ✓

U = Internal energy ✓

$CCl_4 + SiCl_4$

$C_2H_5Br + C_3H_7Br$

$C_2H_5Br + C_2H_5I$


$P^\circ_A > P^\circ_B$
$P_S = P^\circ_A \chi_A + P^\circ_B \chi_B$
V.P
$P_B = P^\circ_B \chi_B$
$P_A = P^\circ_A \chi_A$
$\chi_A = 1$
$\chi_B = 0$
$\chi_B \uparrow$
$\chi_B = 1$
$\chi_A = 0$

QUESTION

The vapor pressure of two liquids A and B are 80 and 60 torr respectively. The total vapor pressure of solution obtained by mixing 3 moles of A and 2 moles of B would be

A. 140 torr

B. 20 torr

C. 68 torr

D. 72 torr ✓

$P_A^0 = 80$ torr $\quad n_A = 3 \quad \chi_A = \frac{3}{3+2} = \frac{3}{5}$

$P_B^0 = 60$ torr $\quad n_B = 2 \quad \chi_B = \frac{2}{3+2} = \frac{2}{5}$

$P_S = P_A^0 \chi_A + P_B^0 \chi_B$

$= 80 \times \frac{3}{5} + 60 \times \frac{2}{5}$

$= 48 + 24 = 72$ torr

$\therefore$

QUESTION – (AIPMT 2002)

A solution containing components A and B follows Raoult's law when

(A) A – B attraction force is greater than A – A and B – B

(B) A – B attraction force is less than A – A and B – B

(C) A – B attraction force remains same as A–A and B –B

(D) Volume of solution is different from sum of volume of solute and solvent

QUESTION – (AIPMT 2003)

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

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 $p^{\circ}_{A} + \chi_{A} (p^{\circ}_{B} - p^{\circ}_{A})$

B $p^{\circ}_{A} + \chi_{A} (p^{\circ}_{A} - p^{\circ}_{B})$

C $p^{\circ}_{B} + \chi_{A} (p^{\circ}_{B} - p^{\circ}_{A})$

D $p^{\circ}_{B} + \chi_{A} (p^{\circ}_{A} - p^{\circ}_{B})$

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 2016-II)

Which one of the following is incorrect for ideal solution?

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

B $\Delta G_{mix} = 0$

C $\Delta H_{mix} = 0$

D $\Delta U_{mix} = 0$

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

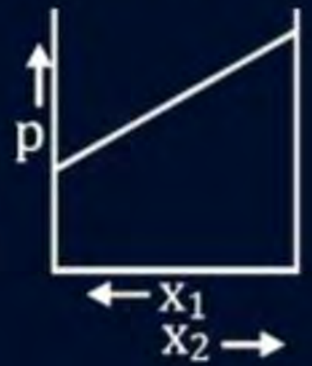
C 400 and 600

D 500 and 600

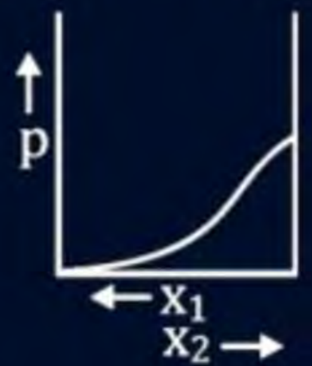
QUESTION* – (NCERT Exemplar)

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

A

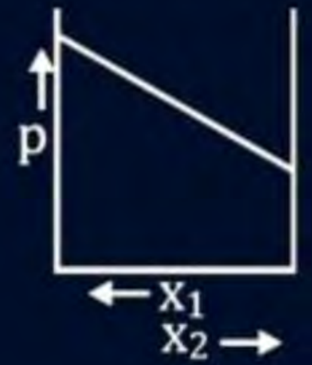


B



C

D



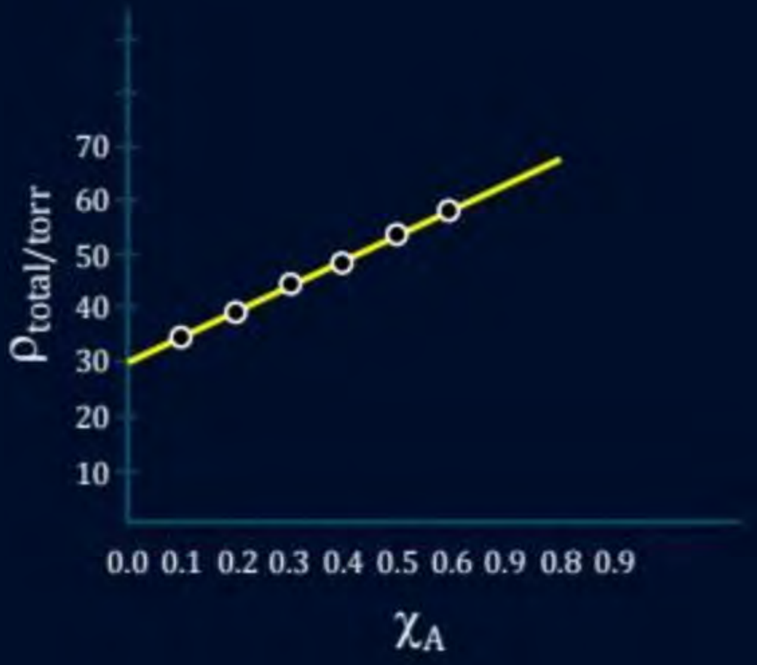
Home work from modules

Solve all questions on Raoult's law

Magarmach Practice Questions (MPQ)

QUESTION

Variation of total vapour pressure with mole fraction of A in a mixture of volatile liquids A and B is given by following graph at 298 K. Thus



(A) vapour pressure of pure A is 30 torr

(B) mole fraction of B in vapour phase in the mixture of 1 mole A and 1 mole B is 0.30

(C) Both of the above are correct

(D) None of the above is correct

QUESTION – (AIIMS 2016, 2013, 2017) 2

Assertion (A): If one component of a solution obeys Raoult's law over a certain range of composition, the other component will not obey Henry's law in that range.

Reason (R): Raoult's law is a special case of Henry's law.

(A) If both assertion and reason are correct and reason is correct explanation of assertion.

(B) If both assertion and reason are correct but reason is not correct explanation of assertion.

(C) If Assertion is correct but reason is incorrect.

(D) If both the assertion and reason are incorrect.

QUESTION 3

Vapour pressure of pure benzene is 74.66 mmHg. When 2 g of a non-volatile hydrocarbon containing 5.6% hydrogen is dissolved in 100 g of benzene, the vapour pressure of benzene is lowered by 0.65 mmHg. Thus, hydrocarbon is

A C_7H_5

B C_6H_{14}

C C_5H_{12}

D $C_{14}H_{10}$

QUESTION 4

Vapour pressure (p) of a solution having χ(mole fraction) of solvent with vapour pressure p° can be represented

A $\frac{dp}{d\chi} = p^\circ$

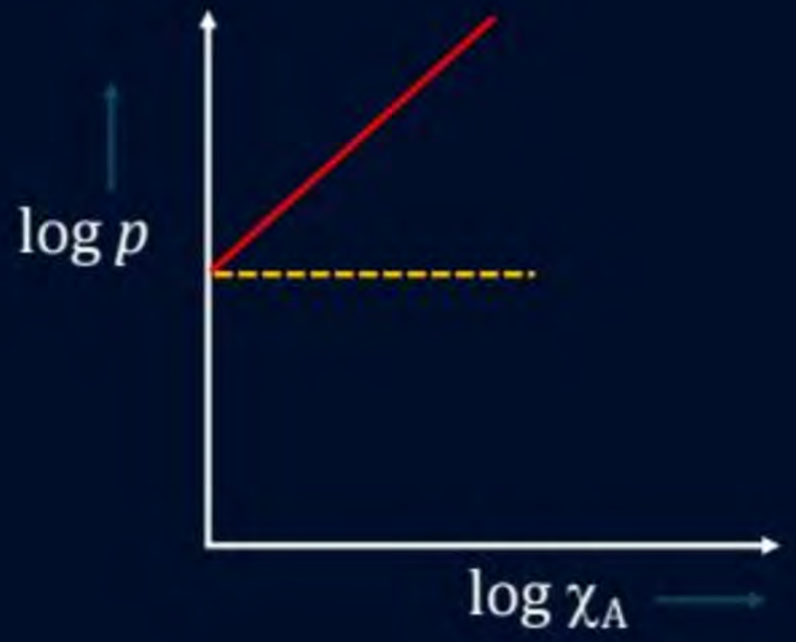
B $\frac{d \log p}{d\chi} = \frac{1}{p}$

C Both of these

D None of these

QUESTION 5

Mole fraction of a solvent with vapour pressure 90 mm Hg is 0.90 in a solution of non-volatile solute. If Raoult's law graphically is, then $\frac{d \log p}{d\chi}$ is:



A 100

B 1.11

C 0.01

D 0.9

THANK YOU