11. COLLIGATIVE PROPERTIES
RAOULT'S LAW - RELATIVE LOWERING OF VAPOUR PRESSURE
SOLUTIONS

TEACHING TASK

JEE MAIN LEVEL QUESTIONS

1. A non-volatile solute is added to a solvent. The vapour pressure of the solution is: **(FA & SA- 2 Marks)**
   A) Higher than that of pure solvent B) Lower than that of pure solvent
   C) Equal to pure solvent D) Independent of solute

Answer:B

Solution:When a non-volatile solute is added to a solvent, the vapor pressure of the solution is lower than that of the pure solvent

2. According to Raoult's law, the vapour pressure of a solution is directly proportional to:
   A) Mole fraction of solute B) Mole fraction of solvent
   C) Moles of solute D) Mass of solvent

Answer:B

Solution:According to Raoult's Law, the vapor pressure of a solution is directly proportional to the mole fraction of the solvent. This is represented by the formula

$$P_{solution} = X_{solvent} \cdot P^{o}_{solvent}$$

3. If the relative lowering of vapour pressure is 0.1, then the mole fraction of solute is:
   A) 0.9 B) 0.1 C) 0.01 D) 1.0

Answer:B

Solution:Raoult's law for a non-volatile solute: $\frac{P^0 - P}{P^0} = X_{solute}$

Given relative lowering = 0.1:

$X_{solute} = 0.1$

4. A 10% (w/w) solution of urea in water will show lowering of vapour pressure because:
   A) Urea is volatile B) Urea is non-volatile
   C) Urea reacts with water D) Urea increases vapour pressure

Answer:B

Solution:Urea is non-volatile, so it decreases vapor pressure of water.

5. The relative lowering of vapour pressure is equal to:

A) $\frac{\Delta P}{P^0} = X_{solute}$

B) $\frac{\Delta P}{P^0} = X_{solvent}$

C) $\Delta P = X_{solute}$

D) $\Delta P = X_{solvent}$

Answer:A

Solution:Relative lowering $\frac{\Delta P}{P^\circ} = \frac{P^\circ - P}{P^\circ} = X_{solute}$

6. Which of the following statements is correct?
   A) Raoult's law is applicable to volatile solutes only
   B) Raoult's law is applicable to non-volatile solutes only
   C) Raoult's law is applicable to both volatile and non-volatile solutes (ideal solutions)
   D) Raoult's law is not related to vapour pressure

Answer:C

Solution:Raoult's law applies to ideal solutions, which can contain volatile or non-volatile solutes (for the solvent's vapour pressure expression).

7. Vapour pressure of pure water at 25°C is 23.8 mm Hg. A solution is prepared by dissolving a non-volatile solute. If vapour pressure of solution is 23.0 mm Hg, the relative lowering of vapour pressure is: **(FA & SA- 3 Marks/4 Marks)**
   A) 0.034 B) 0.80 C) 0.20 D) 0.08

Answer:A

Solution: $P^\circ = 23.8, P = 23.0 \Rightarrow \frac{P^0 - Ps}{P^0} = \frac{23.8 - 23.0}{23.8} = \frac{0.8}{23.8} \approx 0.0336 \approx 0.034$

8. Which property is used to determine molecular mass of non-volatile solutes using Raoult's law?
   A) Osmotic pressure B) Elevation in boiling point
   C) Depression in freezing point D) Relative lowering of vapour pressure

Answer:D

Solution:The property directly used with Raoult's law to get molar mass is relative lowering of vapour pressure.

9. The vapour pressure of pure solvent is 50 mm Hg. A solution has vapour pressure 47.5 mm Hg. The mole fraction of solute is:
   A) 0.025 B) 0.05 C) 0.95 D) 0.10

Answer:B

Solution:Relative lowering of vapor pressure: $\frac{P^0 - P}{P^0} = \frac{50 - 47.5}{50} = \frac{2.5}{50} = 0.05$

From Raoult's law for non-volatile solute:

$$\frac{P^0 - P}{P^0} = X_{solute}$$

$$So, X_{solute} = 0.05$$

10. A solution is prepared by dissolving 18 g of glucose (M = 180 g mol^{-1}) in 180 g of water (M = 18 g mol^{-1}). The relative lowering of vapour pressure is:

(FA & SA- 5 Marks/8 Marks)

A) 0.10 B) 0.05 C) 0.01 D) 0.001

Answer:C

Solution:Moles of glucose = $\frac{18}{180} = 0.1 mol$

Moles of water = $\frac{180}{18} = 10 mol$

Mole fraction of solute: $X_{solute} = \frac{0.1}{0.1+10} = \frac{0.1}{10.1} \approx 0.00990099 \approx 0.0099$

Relative lowering of vapor pressure = $X_{solute} \approx 0.01$

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. Which of the following statements are correct

A) the boiling point of a solution is greater than pure solvent

B) the temperature where the vapour pressure of liquid equals to atmospheric pressure is called its boiling point

C) the vapour pressure of pure solvent is less than the vapour pressure of solution containing non volatile solute.

D) the temperature of liquid remained in the container after evaporation is more than before the evaparation

Answer:A,B

Solution:

A) True for a non-volatile solute — boiling point elevation occurs.

B) True — definition of boiling point.

C) False — adding a non-volatile solute lowers vapour pressure, so pure solvent has higher vapour pressure.

D) False — evaporation causes cooling (latent heat taken from liquid), so temperature decreases, not increases.

12. The relative lowering of vapour pressure of a solution containing a non-volatile solute depends on:

A) Mass of solute B) Nature of solute

C) Mole fraction of solute D) Moles of solvent

Answer:C

Solution:A) Mass of solute — (only indirectly, not directly)

B) Nature of solute — (colligative property →independent of nature)
C) Mole fraction of solute — (directly depends)
D) Moles of solvent — (indirect role, but not directly used)

Comprehension Type:
Comprehension - I

Nature of liquid – Liquids with weak intermolecular forces are more volatile and have higher vapour pressure (e.g., dimethyl ether > ethyl alcohol).

Temperature – Vapour pressure increases with temperature because more molecules escape into the vapour phase.

Purity – Pure liquids have higher vapour pressure than their solution

Vapour pressure does not depend on the amount of liquid, surface area, or shape of the container.

13. Which of the following is a characteristic of a volatile liquid?
A) Strong intermolecular forces B) Low vapour pressure
C) High boiling point D) Easily evaporates at room temperature

Answer:D

Solution:A volatile liquid has weak intermolecular forces, evaporates easily, and has high vapour pressure

14. Among the following, which liquid is expected to show the highest vapour pressure at 25°C?
A) Mercury B) Diethyl ether C) Water D) Ethanol

Answer:B

Solution:Vapour pressure is highest in liquids with weakest intermolecular forces.
Mercury → very strong metallic bonding, lowest vapour pressure.
Water → strong hydrogen bonding → moderate vapour pressure.
Ethanol → hydrogen bonding, less than water but still moderate.
Diethyl ether → weakest intermolecular forces, most volatile, highest vapour pressure

15. Which statement is correct about non-volatile liquids?
A) They have weak intermolecular forces
B) They possess high vapour pressure
C) They show negligible evaporation at room temperature
D) Their boiling points are lower than volatile liquid

Answer:C

Solution:Non-volatile liquids have strong intermolecular forces, low vapour pressure, and negligible evaporation at room temperature.

Comprehension - II

Lowering of Vapour Pressure (LVP):

The decrease in vapour pressure of a solvent when a non-volatile solute is added to it is called lowering of vapour pressure.

LVP= ΔP =P^0-P

Where,P^0=vapour pressure of the pure solvent

P= vapour pressure of solution

16. Lowering of vapour pressure occurs when:

A) A volatile solute is added to a volatile solvent

B) A non-volatile solute is added to a solvent

C) The temperature of the solvent is increased

D) The solvent is pure

Answer:B

Solution:Lowering of vapour pressure happens when a non-volatile solute is added to a solvent.

This reduces the escaping tendency of solvent molecules, resulting in lower vapour pressure.

Integer type:

17. If the vapour pressure of a pure solvent is 80mmHg and that of its solution is 60mmHg, calculate the lowering of vapour pressure_____

Answer:20

Solution:Lowering of vapour pressure = P°-P= 80-60=20

18. The vapour pressure of pure water at 25°C is 23.8mmHg. If a non-volatile solute is added and the solution's vapour pressure becomes 22.3mmHg, calculate the lowering of vapour pressure. _____

Answer:1.5

Solution:Lowering of vapour pressure = 23.8-22.3=1.5

Matrix Matching Type:

19.

LIST - 1	**LIST - 2**
A) Lowering of vapour pressure	1) $\frac{P^o - P}{P^o}$
B) Relative lowering of vapour pressure	2) $\frac{P^o - P}{P^o} = \frac{w}{m} x \frac{M}{W}$
C) Raoult's law	3) $P^o - P$
D) Volatile liquids	4) High Boiling Point
	5) Low Boiling point

Answer:A-3,B-1,C-2,D-5

Solution:A) Lowering of vapour pressure 3) $P^o - P$

B) Relative lowering of vapour pressure 1) $\frac{P^o - P}{P^o}$

C) Raoult's law

D) Volatile liquids

2) $\frac{P^o - P}{P^o} = \frac{w}{m} x \frac{M}{W}$

5) Low Boiling point

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ'S)

1. Rate of evaporation depends up on
   A) Nature of liquid B) Surface area of the liquid
   C) Temperature D) Flow of air current over the surface
   The correct answer is
   A) a, b only B) b, c only C) a, b, and c only D) a, b, c and d

Answer:D

Solution:Factors affecting rate of evaporation
Nature of liquid $\rightarrow$Volatile liquids evaporate faster
Surface area $\rightarrow$ Larger area $\rightarrow$faster evaporation
Temperature $\rightarrow$ Higher temperature $\rightarrow$ faster evaporation
Flow of air current over the surface $\rightarrow$Removes vapour $\rightarrow$increases evaporation

2. Vapour pressure of a liquid:
   A) Increases with temperature
   B) Decreases with temperature
   C) Remains constant with temperature
   D) Depends only on the liquid

Answer:A

Solution:Vapour pressure increases with temperature because more molecules have sufficient energy to escape the liquid surface

3. Adding a non-volatile solute to a solvent:
   A) Increases vapour pressure
   B) Decreases vapour pressure
   C) Has no effect on vapour pressure
   D) Makes vapour pressure equal to pure solvent

Answer:B

Solution:Adding a non-volatile solute reduces the number of solvent molecules at the surface $\rightarrow$ vapour pressure decreases

4. A solution with more ions shows:
   A) Higher vapour pressure
   B) Lower vapour pressure
   C) Same vapour pressure as pure solvent
   D) Vapour pressure depends only on solvent

Answer:B

Solution:More ions → stronger lowering of vapour pressure (greater effect)

5. Boiling point of a solution:
   A) Increases when a non-volatile solute is added
   B) Decreases when a non-volatile solute is added
   C) Remains the same as pure solvent
   D) Depends only on pressure

Answer:A

Solution:Adding non-volatile solute elevates boiling point.

6. According to Raoult's law, for a dilute solution:
   A) Relative lowering of vapour pressure = mole fraction of solute
   B) Lowering of vapour pressure = mole fraction of solute
   C) Vapour pressure of solution = mole fraction of solute
   D) Vapour pressure increases on adding solute

Answer:A

Solution:Relative lowering of vapour pressure = mole fraction of solute.

7. Partial vapour pressure of a component in a solution depends on:
   A) Mole fraction of the component
   B) Total pressure only
   C) Temperature only
   D) Type of container

Answer:A

Solution:Raoult's Law: $P_i = X_i \cdot P_i^0$

8. Which of the following will have the highest vapour pressure at room temperature?
   A) Diethyl ether B) Water C) Glycerol D) Mercury

Answer:A

Solution:Vapor pressure depends on intermolecular forces and molecular weight.
Higher intermolecular forces → lower vapor pressure at a given temperature.
Diethyl ether – weak London/dispersion forces and dipole–dipole, low boiling point → high vapor pressure.
Water – strong hydrogen bonding → moderate vapor pressure.
Glycerol – very strong hydrogen bonding (3 OH groups), high boiling point → very low vapor pressure.
Mercury – metallic bonding in liquid, but as a liquid at room temp, it has very low vapor pressure.
At room temperature, diethyl ether has the highest vapor pressure among these

9. Adding a non-volatile solute to a solvent will cause:
   A) Increase in vapour pressure
   B) Decrease in vapour pressure
   C) No change in vapour pressure
   D) Vapour pressure equal to pure solvent

Answer:B

Solution:Adding a non-volatile solute reduces the number of solvent molecules at the surface $\rightarrow$ vapour pressure decreases

10. If the mole fraction of a non-volatile solute in a solution is 0.5, the relative lowering of vapour pressure will be approximately:
A) 0.01 B) 0.1 C) 0.5 D) 1

Answer:C

Solution: Raoult's law for a non-volatile solute: $\frac{P^0 - P}{P^0} = X_{solute}$

X_{solute}=0.5

$\frac{P^0 - P}{P^0}$=0.5

Relative lowering of vapor pressure = 0.5.

JEE MAINS LEVEL QUESTIONS

1. Which of the following liquids is expected to have the lowest vapour pressure at 25°C?
A) Acetone B) Diethyl ether C) Water D) Methanol

Answer:C

Solution:

Liquid	Intermolecular forces
Acetone	Dipole-dipole, weak hydrogen bonding (C=O)
Diethyl ether	Dipole-dipole, weak London dispersion
Water	Strong hydrogen bonding
Methanol	Hydrogen bonding (weaker than water)

Stronger intermolecular forces $\rightarrow$ lower vapour pressure
Water has strong H-bonding $\rightarrow$ molecules held tightly $\rightarrow$ least likely to escape $\rightarrow$ lowest vapour pressure.
Diethyl ether and acetone are more volatile $\rightarrow$ higher vapour pressure.

2. 0.5mol of a non-volatile solute is dissolved in 1kg of water. The lowering of vapour pressure is 0.5mmHg. If the vapour pressure of pure water is 20?mmHg, find the relative lowering of vapour pressure.
(FA & SA- 3 Marks/4 Marks)
A) 0.025 B) 0.05 C) 0.1 D) 0.1

Answer:A

Solution:Lowering = 0.5 mmHg, $P^0 = 20mmHg$

Relative lowering = $\frac{0.5}{20} = 0.025$

3. Which of the following will show the highest relative lowering of vapour pres sure?

A) 0.1m urea B) 0.1m NaCl C) 0.1m $MgCl_2$ D) 0.1m $Al_2(SO_4)_3$

Answer:D

Solution:For dilute solutions, relative lowering of vapor pressure:

$\frac{P^0 - P}{P^0} \approx i \cdot X_{solute}$ (for same molal concentration, compare van't Hoff factor i)

Actually, more precisely:

For same molality, solvent mass fixed, the number of moles of solute particles differs due to dissociation.

Van't Hoff factor

Urea (non-electrolyte): i=1

NaCl (dissociates to 2 ions): i˜2

$MgCl_2$ (dissociates to 3 ions): i˜3

$Al_2(SO_4)_3$ (dissociates to 5 ions: $2Al^{3+} + 3SO_4^{2-}$): i˜5

Relative lowering i×m for same m $\rightarrow$ highest i gives highest relative lowering.

So $Al_2(SO_4)_3$ with i˜5 will show the highest relative lowering.

4. The vapour pressure of a solution containing 1mol of non-volatile solute in 9mol of solvent is 720mmHg. If the vapour pressure of the pure solvent is 800mmHg, the mole fraction of the solute is:

A) 0.1 B) 0.2 C) 0.05 D) 0.1

Answer:A

Solution:Total moles = 1 + 9 = 10.

Mole fraction of solute = 1/10=0.1

5. Boiling point elevation occurs because: **(FA & SA- 2 Marks)**

A) Vapour pressure increases on adding solute

B) Vapour pressure decreases on adding solute

C) Solvent molecules evaporate faster

D) Non-volatile solute has higher boiling point

Answer:B

Solution:Step 1: Understand boiling point elevation

Boiling point is the temperature at which the vapor pressure of the liquid equals atmospheric pressure.

Step 2: Effect of non-volatile solute

Adding a non-volatile solute lowers the vapor pressure of the solvent at all temperatures.

To reach the atmospheric pressure (for boiling), a higher temperature is needed.

Thus, boiling point elevation occurs because vapor pressure decreases on adding solute.

6. The partial vapour pressure of a component in a solution is given by:

$A) P = X_{solute} \cdot P^0_{solute}$

$B) P = X_{solvent} \cdot P^0_{solvent}$

$C) P = \frac{P^0_{solution}}{X_{solution}} \cdot$

$D) P = P^0_{solvent} + X_{solute} \cdot$

Answer:B

Solution:Volatile solvent $P = X_{\text{solvent}} \cdot P^0_{\text{solvent}}$

7. If 2mol of a volatile liquid A and 3mol of volatile liquid B form an ideal solution, the mole fraction of A in vapour phase is likely to be:
   A) Less than 0.4 B) More than 0.5
   C) Equal to 0.4 D) Equal to 0.5

Answer:C

Solution: $x_A = \frac{2}{2+3} = 0.4$

8. A solution contains 0.2mol of glucose in 1kg of water. The lowering of vapour pressure is 0.5mmHg. The vapour pressure of pure water is 25mmHg. The relative lowering of vapour pressure is: **(FA & SA- 5 Marks/8 Marks)**
   A) 0.02 B) 0.025 C) 0.05 D) 0.01

Answer:A

Solution:Relative lowering = $\frac{\Delta P}{P^0} = \frac{0.5}{25} = 0.02$

9. Which of the following statements is correct?
   A) Volatile liquids have high intermolecular forces and low vapour pressure
   B) Non-volatile liquids have high vapour pressure
   C) Vapour pressure depends on temperature and intermolecular forces
   D) Vapour pressure is independent of solute addition

Answer:C

Solution:A – False: Volatile liquids have low intermolecular forces and high vapor pressure.
B – False: Non-volatile liquids have low vapor pressure.
C – True: Vapor pressure increases with temperature and decreases with stronger intermolecular forces.
D – False: Vapor pressure decreases when a non-volatile solute is added.

10. If 10g of NaCl (M = 58.5) is dissolved in 100g of water, the solution's vapour pressure will:
   A) Increase slightly B) Decrease slightly
   C) Remain the same D) Become zero

Answer:B

Solution:Nature of solute:NaCl is a non-volatile solute.

Effect on vapor pressure: Adding a non-volatile solute lowers the vapor pressure of the solvent (Raoult's law).

Vapor pressure will decrease slightly.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. Which of the following statements about vapour pressure are correct?
    A) Vapour pressure increases with temperature
    B) Vapour pressure depends on the nature of the liquid
    C) Vapour pressure of a solution is always equal to that of the pure solvent
    D) Vapour pressure decreases when a non-volatile solute is added

Answer:A,B,D

Solution:A) True — vapour pressure increases with temperature.
B) True — depends on nature (intermolecular forces).
C) False — solution vapour pressure is not always equal to pure solvent (usually lower if non-volatile solute present).
D) True — adding a non-volatile solute lowers vapour pressure

12. For a solution containing a non-volatile solute, which of the following statements are correct?
    A) Relative lowering of vapour pressure is proportional to the mole fraction of solute
    B) Boiling point of the solution is higher than that of the pure solvent
    C) Vapour pressure of the solution is higher than that of pure solvent
    D) Lowering of vapour pressure depends on the number of solute particles, not their nature

Answer:A,B,D

Solution:A) True — relative lowering $\frac{\Delta P}{P^0} = X_{solute}$ (proportional to mole fraction of solute).
B) True — boiling point is higher (boiling point elevation).
C) False — vapour pressure of solution is lower, not higher.
D) True — lowering depends on number of solute particles (colligative property), not their chemical identity

Statement Type:

A) Both statement I and II are correct and statement II is correct explanation of statement I.
B) Both statement I and II are correct and statement II is not correct explanation of statement I.
C) Statement I is correct and statement II is incorrect.
D) Statement I is incorrect and statement II is correct

13. **Statement I** : The vapour pressure of a solution decreases when a non-volatile solute is added.
Statement II : The lowering of vapour pressure depends on the number of solute particles and is independent of their chemical nature

Answer:A

Solution:Statement I: True — Adding a non-volatile solute reduces vapour pressure.
Statement II: True — Lowering of vapour pressure depends only on number of solute particles (colligative property), not their nature.
Statement II correctly explains Statement I

14. **Statement I** : Boiling point of a solution is higher than that of the pure solvent.
Statement II : Addition of a non-volatile solute lowers the vapour pressure of the solution

Answer:A

Solution:Statement I: True — Boiling point of a solution is higher than that of pure solvent (Boiling Point Elevation).
Statement II: True — Addition of a non-volatile solute lowers vapour pressure of the solution.
Lower vapour pressure is the reason boiling point increases (needs higher temperature to reach atmospheric pressure)

Comprehension Type:
Comprehension - I

The differnce between the vapour pressure of the pure solvent (P_o) and the vapour pressure of the solution (P_s) is known as lowering of vapour pressure.

The ratio of the lowering of vapour pressure (ΔP) to the vapour presure of the pure solvent (P_o) is known as relative lowering of vapour pressure.

According to Raoults law the relative lowering of vapour pressure of a dilute solution of a non volatile solute is equal to the mole fraction of the solute in the solution.

15. The vapour pressure of a solvent A is 0.80 atm. when a non-volatile substance B is added to this solvent its vapour pressure drops to 0.6 atm. the mole fractions of B in the solution is
A) 0.25 B) 0.50 C) 0.75 D) 0.90

Answer:A

Solution:Given:Vapour pressure of pure solvent, $P^0 = 0.80atm$
Vapour pressure of solution, P=0.60atm
Using Raoult's law for non-volatile solute:

Relative lowering of vapour pressure= $\frac{P^0 - P}{P^0} = X_{solute}$

$$X_{solute} = \frac{0.80 - 0.60}{0.80} = \frac{0.20}{0.80} = 0.25$$

16. At room temperature. the mole fraction of a solute is 0.25 and the vapour pressure of a solvent is 0.80 atm. Then the lowering of vapour pressure is
A) 0.75 B) 0.60 C) 0.20 D) 0.80

Answer:C

Solution:Given:Mole fraction of solute = 0.25
So, mole fraction of solvent = 1 - 0.25 = 0.75
Vapour pressure of pure solvent = 0.80 atm
Using Raoult's law:

$$P_{solution} = X_{solvent}.P_0 = 0.75 \times 0.80 = 0.60atm$$

$$\text{Lowering of vapour pressure} = P_0 - P_{solution} = 0.80 - 0.60 = 0.20atm$$

Integer type:

17. The vapour pressure of pure liquid A is 70torr. It forms an ideal solution with another liquid B. The mole fraction of B is 0.2, and the total vapour pressure of the solution is 84torr. The vapour pressure of pure liquid B at the same temperature is: _____torr.

Answer:140

Solution:

$$P_A{}^0 = 70, x_B = 0.2 \Rightarrow x_A = 0.8$$

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

$$84 = 0.8 \times 70 + 0.2 \times P_B{}^0$$

$$84 - 56 = 0.2 P_B{}^0$$

$$28 = 0.2 P_B{}^0 \Rightarrow P_B{}^0 = 28 / 0.2 = 140$$

18. Two liquids A and B form an ideal solution. At 300K, the vapour pressure of a solution containing 1mol of A and 4mol of B is 560mmHg. If 1mol of B is removed, and the vapour pressures of pure A and B are 400mmHg and 600mmHg respectively, the decrease in vapour pressure of the solution is: _____mmHg

Answer:10

Solution:

$$Intial: 1molA, 4molB \rightarrow x_A = 1/5 = 0.2, x_B = 0.8$$

$$P_{initial} = 0.2 \times 400 + 0.8 \times 600 = 80 + 480 = 560mmHg$$

$$Afterremoving 1molB: 3B \rightarrow x_A = 1/4 = 0.25, x_B = 0.75$$

$$P_{final} = 0.25 \times 400 + 0.75 \times 600 = 100 + 450 = 550mmHg$$

$$Decrease = 560 - 550 = 10$$

Matrix Matching Type:

19. **COLUMN-I** **COLUMN-II**

A) Molality P) Unity

B) Relative lowering Q) dilute solutions vapour pressure

C) Raoult's law R) independent of temperature

D) $X_{solute} + X_{solvent}$ S) Mole fraction of solute

Answer:A-R,B-S,C-Q,D-P

Solution:

A) Molality R) independent of temperature

B) Relative lowering S) Mole fraction of solute

C) Raoult's law Q) dilute solutions vapour pressure

D) $X_{solute} + X_{solvent}$ P) Unity

KEY

				TEACHING TASK					
			JEE MAIN LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
B	B	B	B	A	C	A	D	B	C
			JEE ADVANCED LEVEL QUESTIONS						
11	12	13	14	15	16	17	18	19	
A,B	C	D	B	C	B	20	15	A-3,B-1,C-2,D-5	
				LEARNERS TASK					
			CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ'S)						
1	2	3	4	5	6	7	8	9	10
D	A	B	B	A	A	A	A	B	C
			JEE MAINS LEVEL QUESTIONS						
1	2	3	4	5	6	7	8	9	10
C	A	D	A	B	B	C	A	C	B
			JEE ADVANCED LEVEL QUESTIONS						
11	12	13	14	15	16	17	18	19	
A,B,D	A,B,D	A	A	A	C	140	10	A-R,B-S,C-Q,D-P	