
12. IDEAL AND NON-IDEAL SOLUTION

SOLUTIONS

TEACHING TASK

JEE MAINS LEVEL QUESTIONS

1. Which statement about an ideal solution is correct?

- A) It always releases heat when mixed.
- B) It obeys Raoult's law at all compositions.
- C) Its volume changes a lot on mixing.
- D) Its vapour pressure is always zero

Answer: B

Solution:

A – False: For ideal solutions, $\Delta H_{\text{mix}} = 0$, no heat released or absorbed.

B – True: Ideal solutions obey Raoult's law for all components over entire composition range.

C – False: $\Delta V_{\text{mix}} = 0$ for ideal solutions.

D – False: Vapor pressure is not zero; it follows Raoult's law.

2. If a binary mixture shows positive deviation from Raoult's law then:

(FA & SA- 2 Marks)

- A) total vapour pressure is lower than expected
- B) total vapour pressure is higher than expected
- C) it must be an azeotrope with highest boiling point
- D) ΔH_{mix} is negative

Answer: B

Solution: Positive deviation means:

A-B interactions weaker than A-A or B-B.

Total vapor pressure higher than Raoult's law prediction.

$H_{\text{mix}} > 0$ (endothermic).

Can form minimum boiling azeotrope.

3. Which pair is a common example of negative deviation (strong A-B interactions)?

- A) Ethanol + Hexane
- B) Acetone + Chloroform
- C) Benzene + Toluene
- D) Hexane + Heptane

Answer: B

Solution: Acetone-Chloroform (H-bonding between them \rightarrow stronger A-B interaction).

4. A mixture that boils at a constant temperature and has the same liquid and

vapour composition is called:

- A) Supersaturated solution B) Azeotrope
C) Ideal solution D) Colloid

Answer:B

Solution:A mixture that boils at a constant temperature and has the same composition in liquid and vapor phases is called an azeotrope.

5. Which thermodynamic sign is true for positive deviation on mixing

(FA & SA- 3 Marks / 4 Marks)

- A) $\Delta H_{\text{mix}} < 0$ and $\Delta V_{\text{mix}} < 0$
B) $\Delta H_{\text{mix}} > 0$ and $\Delta V_{\text{mix}} > 0$
C) $\Delta H_{\text{mix}} = 0$ and $\Delta V_{\text{mix}} = 0$
D) $\Delta H_{\text{mix}} < 0$ and $\Delta V_{\text{mix}} > 0$

Answer:B

Solution:Step 1: Positive deviation from Raoult's law

Positive deviation occurs when A-B interactions are weaker than A-A and B-B interactions.

Step 2: Thermodynamic changes

$\Delta H_{\text{mix}} > 0$ (endothermic, because energy required to break stronger A-A / B-B bonds)

$\Delta V_{\text{mix}} > 0$ (volume increases, because molecules are held less tightly in the mixture)

6. Which pair behaves nearly ideally (close to Raoult's law)?

- A) Methanol + Water B) Benzene + Toluene
C) Ethanol + Water (95:5) D) Acetone + Chloroform

Answer:B

Solution:Ideal solutions obey Raoult's law when:

Intermolecular forces between A-A, B-B, and A-B are nearly equal.

Molecules are similar in size, shape, and chemical nature.

Methanol + Water – Strong H-bonding, but different strengths → negative deviation (not ideal).

Benzene + Toluene – Both non-polar, similar structures, similar intermolecular forces → nearly ideal.

Ethanol + Water (95:5) – Strong H-bonding, non-ideal.

Acetone + Chloroform – H-bonding between chloroform H and acetone O → negative deviation.

7. A minimum-boiling azeotrope is associated with:

- A) Negative deviation and maximum boiling point
B) Positive deviation and minimum boiling point
C) No deviation and constant boiling at high temperature
D) Immiscible liquids only

Answer:B

Solution:Minimum-boiling azeotrope arises when vapour pressure is higher than

ideal (positive deviation)

8. Why does acetone + chloroform mixture show lower vapour pressure than predicted? **(FA & SA- 5 Marks / 8 Marks)**
- A) Because A-B attractions are weaker
 - B) Because A-B attractions are stronger (hydrogen bonding)
 - C) Because both are gases at room temperature
 - D) Because chloroform evaporates without mixing

Answer:B

Solution: Stronger A-B interactions reduce vapour pressure → negative deviation (acetone accepts H from CHCl_3)

9. Which of the following is true for an ideal binary solution?
- A) Mole fraction of A in liquid = mole fraction of A in vapour
 - B) $\Delta H_{\text{mix}} = 0$ and $\Delta V_{\text{mix}} = 0$
 - C) It always forms an azeotrope
 - D) Vapour pressures do not depend on composition

Answer:B

Solution: Ideal binary solution has no enthalpy or volume change on mixing.

10. If the experimental total vapour-pressure curve lies below the straight ideal line, the mixture shows:
- A) Positive deviation (higher vapour pressure)
 - B) Negative deviation (lower vapour pressure)
 - C) Ideal behaviour
 - D) Phase separation into two layer

Answer:B

Solution: Experimental curve below the ideal straight line means stronger A-B attractions → lower total vapour pressure.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. Solutions showing positive deviations from Raoult's law include
- A) Acetone + Carbon disulphide
 - B) Acetone + Ethyl alcohol
 - C) Acetone + Benzene
 - D) Acetone + Aniline

Answer:A,B,C

Solution: Examples of solutions showing positive deviations

Carbon tetrachloride + benzene
Carbon tetrachloride + chloroform
Carbon tetrachloride + Toluene
Acetone + Carbon disulphide
Acetone + Ethyl alcohol
Acetone + Benzene
Methyl alcohol + Water
Ethyl alcohol + Water

12. Which statements are true for ideal solutions?
- A) They obey Raoult's law at all concentrations.
 - B) $\Delta H_{\text{mix}} = 0$.
 - C) $\Delta V_{\text{mix}} = 0$.
 - D) They always form azeotrope

Answer: A, B, C

Solution: A) Obey Raoult's law at all concentrations \rightarrow True.

B) $\Delta H_{\text{mix}} = 0 \rightarrow$ True.

C) $\Delta V_{\text{mix}} = 0 \rightarrow$ True.

D) Always form azeotrope \rightarrow False

Statement Type:

A) Statement - I is True, Statement -II is True; Statement -II is a correct explanation for Statement -I

B) Statement -I is True, Statement -II is True; Statement -II is NOT a correct explanation for Statement -I

C) Statement -I is True, Statement -II is False

D) Statement -II is False, Statement -I is True

13. **Statement I** : The mixing of two completely miscible liquid. A and B showing positive deviation from Raoult's law is followed by an absorption of heat
- Statement II** : The A- B molecular interaction forces are stronger than the A-A or B-B molecular interaction forces.

Answer: C

Solution:

Statement I: True — Positive deviation mixtures absorb heat ($\Delta H_{\text{mix}} > 0$), so endothermic.

Statement II: False — In positive deviation, A-B interactions are weaker than A-A and B-B.

14. **Statement I** : A mixture of ethanol and hexane shows positive deviation from Raoult's law
- Statement II** : In ethanol, the molecules are associated through intramolecular hydrogen bonding.

Answer: C

Solution:

Statement I: True — Ethanol + Hexane shows positive deviation because strong H-bonding in ethanol breaks when mixed with hexane.

Statement II: False — Ethanol molecules are associated by intermolecular hydrogen bonding (between molecules), not intramolecular (within same molecule).

Comprehension Type:

Comprehension - I

An ideal solution is one which obeys Raoult's law over the entire range of concentration and temperature, and on mixing. So for ideal solutions the

conditions are,

It should obey Raoult's Law:

The vapour pressure of the solution is exactly what Raoult's law predicts (no surprises)

$$P_A = P_A^0 X_A \text{ and } P_B = P_B^0 X_B$$

No heat change when mixed:

When we mix the two liquids, no heat is absorbed or released

$$\Delta H_{\text{mix}} = 0$$

No volume change when mixed:

The total volume after mixing = sum of volumes before mixing

$$\Delta V_{\text{mix}} = 0$$

15. According to the definition of an ideal solution, which of the following conditions must be true?
- A) It must show either positive or negative deviation from Raoult's law.
 - B) The volume of the mixture must be less than the sum of the volumes of the individual components.
 - C) The enthalpy change (ΔH) upon mixing the components must be zero.
 - D) The intermolecular forces between different molecules (A-B) must be stronger than those between like molecules (A-A or B-B).

Answer:C

Solution:For an ideal solution, the key conditions are:

It must obey Raoult's law at all concentrations.

There must be no heat change during mixing ($\Delta H_{\text{mix}} = 0$).

There must be no volume change ($\Delta V_{\text{mix}} = 0$).

The intermolecular forces A-B \sim A-A \sim B-B.

16. A solution is formed by mixing two liquids, A and B. It is observed that the total volume of the mixture is exactly equal to the sum of the volumes of A and B before mixing, and the vapor pressure of the solution precisely matches the predictions of Raoult's law. What can be conclusively stated about this solution?
- A) The solution is ideal, and the process of mixing is exothermic.
 - B) The solution is non-ideal because it obeys Raoult's law.
 - C) The solution is ideal, and the process of mixing involves no heat change.
 - D) The solution is non-ideal because there is no volume change.

Answer:C

Solution:Given:

No volume change $\rightarrow \Delta V_{\text{mix}} = 0$

Obeys Raoult's law exactly \rightarrow Ideal behavior

Therefore, ΔH_{mix} must also be 0 (no heat absorbed or evolved)

Integer type:

17. The vapour pressure of pure liquid A is 100 mmHg. Its mole fraction in a solution is 0.6. What is the partial vapour pressure of A in the solution_____

Answer:60

Solution: Given: Vapour pressure of pure liquid A, $P_A^0 = 100$ mmHg

Mole fraction of A in solution, $x_A = 0.6$

Using Raoult's Law: $P_A = x_A \times P_A^0 = 0.6 \times 100 = 60$ mmHg

18. In order to exhibit the maximum boiling point azeotropy then change in volume is always greater than _____

Answer:0

Solution: For maximum boiling azeotrope, it shows negative deviation from Raoult's law, and $\Delta V_{\text{mix}} < 0$

So, the change in volume is always less than zero

Matrix Matching Type:19. **Column-I**

Examples of Solution

- A) Acetone + Aniline
- B) Water + CH_3OH
- C) Benzene + toluene
- D) n-Hexane + n-heptane

Column-II

Types of Solution

- p) +ve deviation from ideal behaviour
- q) -ve deviation from ideal behaviour
- r) Ideal solution
- s) Colloids

Answer:A-q,B-p,C-r,D-r

Solution:

- | | |
|-----------------------------------|---------------------------------------|
| A) Acetone + Aniline | q) -ve deviation from ideal behaviour |
| B) Water + CH_3OH | p) +ve deviation from ideal behaviour |
| C) Benzene + toluene | r) Ideal solution |
| D) n-Hexane + n-heptane | r) Ideal solution |

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ'S)

1. A solution that obeys Raoult's law is called
- | | |
|--------------------|-----------------------|
| A) normal solution | B) non-ideal solution |
| C) ideal solution | D) saturated solution |

Answer:C

Solution: An ideal solution is one that obeys Raoult's law at all compositions and shows no heat or volume change on mixing

2. A mixture of two completely miscible non-ideal liquids which distil as such without change in its composition at a constant temperature as though it were a pure liquid. This mixture is known as
- | | |
|--------------------------|-----------------------|
| A) Binary liquid mixture | B) Azeotropic mixture |
| C) Eutectic mixture | D) Ideal mixture |

Answer:B

Solution: Such a mixture boils at a constant temperature and liquid and vapour have the same composition \rightarrow this is an azeotrope

3. The liquid pair benzene-toluene shows
 A) Irregular deviation from Raoult's law
 B) Negative deviation from Raoult's law
 C) Positive deviation from Raoult's law
 D) Practically no deviation from Raoult's law

Answer: D

Solution: Both are non-polar hydrocarbons with similar molecular sizes and intermolecular forces, so they behave almost ideally

4. Liquids A and B form an ideal solution
 A) The enthalpy of mixing is zero
 B) The entropy of mixing is zero
 C) The free energy of mixing is zero
 D) The free energy as well as the entropy of mixing are each zero

Answer: A

Solution: For an ideal solution:

Intermolecular forces between A-A, B-B, and A-B are equal.

No heat is absorbed or evolved on mixing $\rightarrow \Delta H_{\text{mix}} = 0$

Volume change on mixing is zero $\rightarrow \Delta V_{\text{mix}} = 0$

Entropy of mixing is not zero because mixing increases disorder $\rightarrow S_{\text{mix}} > 0$

Gibbs free energy of mixing is negative $\rightarrow \Delta G_{\text{mix}} < 0$

5. In mixture A and B components show negative deviation as
 A) $\Delta V_{\text{mix}} > 0$
 B) $\Delta H_{\text{mix}} < 0$
 C) A-B interactions is weaker than A-A and B-B interaction
 D) A-B interactions is strong than A-A and B-B interaction

Answer: B, D

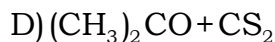
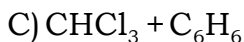
Solution: Negative deviation arises because A-B interactions are stronger; this also makes ΔH_{mix} negative.

6. Which of the following liquid pairs shows a positive deviation from Raoult's law
 A) Water - hydrochloric acid B) Water - nitric acid
 C) Acetone - chloroform D) Benzene-methanol

Answer: D

Solution: Benzene-methanol: benzene nonpolar, methanol polar+H-bonding \rightarrow weaker A-B interactions \rightarrow positive deviation.

7. Identify the mixture that shows positive deviation from Raoult's law
 A) $\text{CH}_3 + (\text{CH}_3)_2\text{CO}$ B) $(\text{CH}_3)_2\text{CO} + \text{C}_6\text{H}_5\text{NH}_2$

**Answer:D**Solution: Acetone + CS_2 is a classic example showing positive deviation.

8. The azeotropic mixture of water and HCl boils at 108.5°C . When this mixture is distilled, it is possible to obtain
- Pure hydrogen chloride
 - Pure water
 - Pure water as well as pure HCl
 - Neither HCl nor H_2O in their pure states

Answer:D

Solution: An azeotrope distills as itself, so you cannot obtain the pure components by simple distillation.

9. Azeotropic mixture of HCl and water has **(AFMC 1997)**
- 84% HCl
 - 22.2% HCl
 - 63% HCl
 - 20.2% HCl

Answer:D

Solution: Hydrochloric acid forms a maximum boiling azeotrope with water.

The constant-boiling mixture of HCl -water at 1 atm contains about 20.2% HCl by mass.

10. Which of the following form/s ideal solution?
- Ethyl bromide + Ethyl iodide
 - Ethyl alcohol + water
 - Chloroform + Benzene
 - Benzene + Toluene
- i, ii, iii are correct
 - i, iii, iv are correct
 - i, iv are correct
 - All are correct

Answer:C

Solution: i) Ethyl bromide + Ethyl iodide \rightarrow Ideal
 ii) Ethyl alcohol + water \rightarrow Positive deviation
 iii) Chloroform + Benzene \rightarrow Negative deviation
 iv) Benzene + Toluene \rightarrow Ideal

JEE MAINS LEVEL QUESTIONS

1. A solution of two volatile liquids shows positive deviation from Raoult's law. Which of the following is true?
- A-B interactions are stronger than A-A and B-B interactions
 - A-B interactions are weaker than A-A and B-B interactions
 - Solution will have higher boiling point than ideal solution
 - Solution will have negative deviation in vapour pressure

Answer:B

Solution: Positive deviation from Raoult's law means:

A-B interactions < A-A and B-B interactions

Molecules escape more easily \rightarrow higher vapor pressure than ideal

Lower boiling point than ideal (not higher)

2. 20 g of a non-volatile solute is dissolved in 180 g of water. The solution is ideal. If the mole fraction of water is 0.9, the mole fraction of solute is:

(FA & SA- 3 Marks / 4 Marks)

- A) 0.1 B) 0.09 C) 0.11 D) 0.2

Answer:A

Solution: For a two-component solution: $X_{\text{solute}} + X_{\text{solvent}} = 1$

$$\text{Given: } X_{\text{water}} = 0.9$$

$$X_{\text{solute}} = 1 - 0.9 = 0.1$$

3. Which of the following is an example of maximum boiling azeotrope?
- A) Ethanol–water mixture B) Hydrochloric acid–water mixture
C) Nitric acid–water mixture D) Acetone–water mixture

Answer:B,C

Solution: B) Hydrochloric acid–water mixture and C) Nitric acid–water mixture Both are examples of maximum boiling azeotropes due to strong hydrogen bonding and negative deviation from Raoult's law.

4. If a solution shows a negative deviation from Raoult's law, then:

(FA & SA- 2 Marks)

- A) The total vapour pressure is higher than predicted
B) The total vapour pressure is lower than predicted
C) There is no change in vapour pressure
D) Both liquids are non-volatile

Answer:B

Solution: Negative deviation from Raoult's law occurs when A–B interactions are stronger than A–A and B–B interactions.

This makes it harder for molecules to escape into the vapor phase.

Vapor pressure is lower than predicted by Raoult's law.

5. When 40 mL of liquid X is mixed with 60 mL of liquid Y, the total volume is observed to be 97 mL. Which statement is correct?

(FA & SA- 5 Marks / 8 Marks)

- A) Solution shows positive deviation B) Solution shows negative deviation
C) Ideal solution is formed D) Solution shows azeotropy

Answer:B

Solution:

Step 1: Volume change on mixing

Ideal solution: $\Delta V_{\text{mix}} = 0$ (volume = sum of individual volumes).

Here: $40 + 60 = 100$ mL expected, but observed = 97 mL $\rightarrow \Delta V_{\text{mix}} = -3$ mL (volume contraction).

Step 2: Relate to deviation from Raoult's law

Volume contraction usually occurs when A–B interactions are stronger than A–A and B–B \rightarrow negative deviation from Raoult's law.

6. A graph of temperature vs mole fraction of a binary solution shows a minimum boiling point at 0.4 mole fraction of component A. Which type of azeotrope is this?
- A) Maximum boiling azeotrope B) Minimum boiling azeotrope
C) Ideal solution D) Non-volatile solution

Answer:B

Solution:A minimum on the T vs x plot = minimum-boiling azeotrope (positive deviation type)

7. In a binary solution of benzene and toluene, at a certain composition the vapour pressure equals the sum of partial pressures predicted by Raoult's law. This indicates:
- A) Positive deviation B) Negative deviation
C) Ideal solution D) Maximum boiling azeotrope

Answer:C

Solution:Observed vapour pressure equals Raoult's law prediction → ideal behavior.

8. Which of the following statements is true for azeotropic mixtures?
- i) Boil at constant temperature like a pure liquid
ii) Liquid and vapour have the same composition
iii) Components can be separated by simple distillation
iv) They are either maximum or minimum boiling azeotropes
- A) i, ii, iv B) i, ii, iii C) i, iii, iv D) All are correct

Answer:A

Solution:i) True – Azeotropes boil at a constant temperature.
ii) True – At the azeotropic composition, liquid and vapor have the same composition.
iii) False – Components cannot be separated by simple distillation at azeotropic composition (mixture distills unchanged).
iv) True – Azeotropes are either maximum boiling (negative deviation) or minimum boiling (positive deviation).

9. A binary solution of liquids A and B shows positive deviation from Raoult's law. Which of the following will be true?
- A) Boiling point of the solution is higher than ideal solution
B) Boiling point of the solution is lower than ideal solution
C) Volume contraction occurs
D) Total vapour pressure is lower than predicted

Answer:B

Solution:Boiling point lower than ideal (higher vapour pressure → lower boiling point).

10. 50 mL of ethanol is mixed with 50 mL of water. The total volume is 96 mL. This indicates:
- A) Positive deviation from Raoult's law
B) Negative deviation from Raoult's law
C) Ideal solution

D) Formation of minimum boiling azeotrope

Answer:B

Solution: $50 + 50 = 100$ mL expected, observed 96 mL \rightarrow volume decrease \rightarrow negative deviation.

JEE ADVANCED LEVEL QUESTIONS

Multi correct answer type:

11. A solution of acetone and chloroform shows negative deviation from Raoult's law. Which of the following is true?

- A) A-B interactions are stronger than A-A and B-B interactions
- B) A-B interactions are weaker than A-A and B-B interactions
- C) Total vapour pressure is higher than ideal solution
- D) Total vapour pressure is lower than ideal solution

Answer:A,D

Solution: A) A-B interactions stronger than A-A and B-B \rightarrow True (due to H-bonding).

B) Weaker \rightarrow False.

C) Vapour pressure higher \rightarrow False.

D) Vapour pressure lower \rightarrow True.

12. In a binary ideal solution, which of the following statements are correct?

- A) Total vapour pressure is sum of partial pressures of each component
- B) Partial pressures obey Raoult's law
- C) There is no heat absorbed or evolved on mixing
- D) Volume of mixture is equal to sum of individual volumes

Answer:A,B,C,D

Solution:

A) Total vapour pressure = sum of partial pressures \rightarrow True (Dalton's + Raoult's).

B) Partial pressures obey Raoult's law \rightarrow True.

C) No heat absorbed/evolved \rightarrow True ($\Delta H_{\text{mix}} = 0$).

D) Volume of mixture = sum of volumes \rightarrow True ($\Delta V_{\text{mix}} = 0$).

13. A solution of ethanol and water shows positive deviation from Raoult's law. Which statements are correct?

- A) Boiling point of solution is lower than predicted for ideal solution
- B) Heat is absorbed during mixing
- C) Volume of solution increases on mixing
- D) Vapour pressure is lower than predicted by Raoult's law

Answer:A,B,C

Solution:

A) Boiling point lower than ideal prediction \rightarrow True (higher vapour pressure \rightarrow lower b.p.).

B) Heat absorbed during mixing \rightarrow True ($\Delta H_{\text{mix}} > 0$).

C) Volume increases on mixing \rightarrow True ($\Delta V_{\text{mix}} > 0$).

D) Vapour pressure lower \rightarrow False (positive deviation \rightarrow vapour pressure higher).

Comprehension Type:**Comprehension - I**

In a solution, If solute-solvent forces are weaker than solute-solute or solvent-solvent forces, the solution shows positive deviation.

In such cases, the molecules can escape more easily \rightarrow vapour pressure is higher than predicted by Raoult's law.

So, the total vapour pressure of the mixture $>$ expected vapour pressure (from Raoult's law).

14. If in a solution, solute-solvent interactions are weaker than solute-solute or solvent-solvent interactions, which of the following is true?
- A) Solution shows negative deviation from Raoult's law
 - B) Solution shows positive deviation from Raoult's law
 - C) Vapour pressure is lower than predicted by Raoult's law
 - D) Molecules escape less easily from the solution

Answer:B

Solution: This leads to positive deviation from Raoult's law (molecules escape more easily).

- A) Negative deviation \rightarrow False.
- B) Positive deviation \rightarrow True.
- C) Vapour pressure lower \rightarrow False (it's higher).
- D) Molecules escape less easily \rightarrow False (they escape more easily).

15. In a solution with weaker solute-solvent forces, the total vapour pressure of the mixture:
- A) Equals the vapour pressure predicted by Raoult's law
 - B) Is lower than predicted by Raoult's law
 - C) Is higher than predicted by Raoult's law
 - D) Cannot be determined

Answer:C

Solution: Higher than predicted by Raoult's law (positive deviation).

Comprehension - II**Azeotropic mixtures (Constant boiling mixtures):****Definition:**

Mixtures of liquids that boil at a fixed temperature (like pure liquids).

They have the same composition in liquid and vapour phase.

They cannot be separated by fractional distillation.

Types of azeotropes:

- 1. Minimum boiling azeotrope
- 2. Maximum boiling azeotrope

16. Which of the following statements correctly describes an azeotropic mixture?
- A) Boils at constant temperature like a pure liquid
 - B) Composition of liquid and vapour phases is different
 - C) Can be separated completely by fractional distillation
 - D) Boils at variable temperature depending on composition

Answer:A

Solution:A) Boils at constant temperature like a pure liquid → True.

B) Composition of liquid and vapour phases is different → False (same composition at azeotrope point).

C) Can be separated completely by fractional distillation → False (cannot be separated by distillation).

D) Boils at variable temperature depending on composition → False (at azeotrope composition, fixed boiling point).

17. Which of the following is true about azeotropes?

A) They have the same composition in liquid and vapour phase

B) They can be either minimum or maximum boiling type

C) They can always be separated by simple distillation

D) They are mixtures of solids and liquids

Answer:A,B

Solution:A) Same composition in liquid and vapour phase → True.

B) Either minimum or maximum boiling type → True.

C) Always separated by simple distillation → False (cannot be separated by distillation).

D) Mixtures of solids and liquids → False (azeotropes are liquid mixtures).

Integer type:

16. For ideal solution showing positive or negative deviation the total volume of the solution will not be equal to _____

Answer:0

Solution:In ideal solutions showing positive or negative deviation, the total volume of the solution will not be equal to Sum of individual volumes.

$$\Delta V \neq 0$$

17. If the solution doesn't form an azeotrope then change in enthalpy of that solution is _____

Answer:0

Solution:If the solution does not form an azeotrope, then the change in enthalpy (ΔH_{mix}) is Zero.

Matrix Matching Type:

18. **COLUMN-I**

A) Ideal solution

B) Non-ideal solution showing positive deviation

C) Non-ideal solution showing negative deviation

COLUMN-II

1. Total vapour pressure is lower than predicted; stronger A-B interactions

2. Obeys Raoult's law exactly; no change in enthalpy or volume

3. Total vapour pressure is higher than predicted; weaker A-B interaction

Answer: A – 2, B – 3, C – 1

Solution:

A) Ideal solution

2. Obeys Raoult's law exactly; no change in enthalpy or volume

B) Non-ideal solution

showing positive deviation

3. Total vapour pressure is higher than predicted; weaker A-B interaction

C) Non-ideal solution showing negative deviation

1. Total vapour pressure is lower than predicted; stronger A-B interactions

KEY

			TEACHING TASK							
			JEE MAINS LEVEL QUESTIONS							
1	2	3	4	5	6	7	8	9	10	
B	B	B	B	B	B	B	B	B	B	
			JEE ADVANCED LEVEL QUESTIONS							
11	12	13	14	15	16	17	18	19		
A,B,C	A,B,C	C	C	C	C	60	0	A-q,B-p,C-r,D-r		
			LEARNERS TASK							
			CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ'S)							
1	2	3	4	5	6	7	8	9	10	
C	B	D	A	B,D	D	D	D	D	C	
			JEE MAINS LEVEL QUESTIONS							
1	2	3	4	5	6	7	8	9	10	
B	A	B,C	B	B	B	C	A	B	B	
			JEE ADVANCED LEVEL QUESTIONS							
11	12	13	14	15	16	16	17	18		
A,D	A,B,C,D	A,B,C	B	C	A	0	0	A – 2, B – 3, C – 1		