LAKSHYA (JEE)

Solution

1. Benzene and toluene forms an ideal solution. Vapour pressure of pure benzene is 100 torr while that of pure toluene is 50 torr. If mole faction of benzene in liquid phase is $\frac{1}{3}$. Then calculate the of mole fraction of benzene in vapour phase.

(A) $\frac{2}{3}$ (B) $\frac{1}{2}$

(C) $\frac{2}{5}$ (D) $\frac{1}{3}$

2. Mole fraction of the toluene in the vapour phase which is in equilibrium with a solution of benzene ($p° = 120$ torr) and toluene ($p° = 80$ torr) having 2.0 mol of each is:

(A) 0.50   (B) 0.25

(C) 0.60   (D) 0.40

3. At $40°$ C, vapour pressure in torr of methanol and ethanol solution is $P = 119x + 135$, where x is the mole fraction of methanol. Hence:

(A) vapour pressure of pure methanol is 119 torr
(B) vapour pressure of pure ethanol is 135 torr
(C) vapour pressure of equimolar mixture of each is 127 torr
(D) mixture is completely immiscible.

4. Benzene and toluene form an ideal solution. The vapour pressure of benzene at $55°$ C is 400 mm He while the vapour pressure of toluene at $55°$ C is 130 mm Hg. What is the vapour pressure of a solution consisting of 0.5 mole fraction of benzene and 0.5 mole fraction of toluene at $55°$ C?

(A) Lower than 130 mm Hg
(B) Between 130 and 400 mm Hg
(C) Exactly 400 mm Hg
(D) Greater than 400 mm Hg

5. Ideal solution is formed when its components

(A) have zero heat of mixing only
(B) have zero volume change on mixing only
(C) have zero heat of mixing and zero volume change
(D) can be converted into gases

6. For an ideal solution with $P_A > P_B$ which of the following is true?

(A) $\chi_{A(I)} = \chi_{B(V)}$

(B) $\chi_{A(I)} > \chi_{B(V)}$

(C) $\chi_{A(I)} < \chi_{B(V)}$

(D) No relationship in their mole fraction

7. Equal moles of benzene and toluene are mixed the V.P. of benzene and toluene in pure state are 700 and 600 mm Hg respectively. The mole fraction of benzene in vapour state is

(A) 0.7   (B) 0.47

(C) 0.50   (D) 0.54

8. In ideal solution of non-volatile solute B in solvent A in 2 : 5 molar ratio has vapour pressure 250 mm. If a another solution in ratio 3 : 4 prepared then vapour pressure above this solution

(A) 200 mm
(B) 250 mm
(C) 350 mm
(D) 400 mm

9. Which one of the following is the incorrect form of Raoult's law

   (A) $\dfrac{P_s}{P^0} = \dfrac{N}{n+N}$

   (B) $\dfrac{P^0}{P^0 - P_s} = 1 + \dfrac{N}{n}$

   (C) $\dfrac{P^0 - P_s}{P_s} = \dfrac{n}{n+N}$

   (D) $\dfrac{P_s}{P^0 - P_s} = \dfrac{N}{n}$

10. The vapour pressure of pure A is 10 torr and at the same temperature when 1 g of B is dissolved in 20 gm of A, its vapour pressure is reduced to 9.0 torr. If the molecular mass of A is 200 amu, then the molecular mass of B is:

    (A) 100 amu
    (B) 90 amu
    (C) 75 amu
    (D) 120 amu

ANSWERS

1. (B)
2. (D)
3. (B)
4. (B)
5. (C)
6. (C)
7. (D)
8. (A)
9. (C)
10. (B)

Note – If you have any query/issue

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