LAKSHYA (JEE)

Solution

DPP-06

1. Vapour pressure of a solvent containing nonvolatile solute is-
(A) More than the vapour pressure of a solvent
(B) Less than the vapour pressure of solvent
(C) Equal to the vapour pressure of solvent
(D) None of these

2. Mol fraction of the component A in vapour phase is x_1 and mol fraction of component A in liquid mixture is x_2 then (P_A^0 = vapour pressure of pure A; P_B^0 = vapour pressure of pure B). then total vapour pressure of the liquid mixture is-
(A) $\frac{P_A^0 x_2}{x_1}$ (B) $\frac{P_A^0 x_1}{x_2}$
(C) $\frac{P_B^0 x_1}{x_2}$ (D) $\frac{P_B^0 x_2}{x_1}$

3. Two liquids A and B have $P_A^0 : P_B^0 = 1:3$ at a certain temperature. If the mole fraction ratio of $X_A : X_B$ = 1:3, the mole fraction of A in vapour in equilibrium with the solution at a given temperature is:
(A) 0.1 (B) 0.2
(C) 0.5 (D) 1.0

4. Pressure over ideal binary liquid mixture containing 10 moles each of liquid A and B is gradually decreased isothermally. If $P_A^0 = 200$ mm Hg and $P_B^0 = 100$ mm Hg, find the pressure at which half of the liquid is converted into vapour
(A) 150 mm Hg (B) 166.5 mm Hg
(C) 133 mm Hg (D) 141.4 mm Hg

5. Two liquids A & B form an ideal solution. What is vapour pressure of solution containing 2 moles of A and 3 moles of B at 300 K? [Given: At 300 K, Vapour pr. Of pure liquid A $\left(P_A^0\right)$ = 100 torr, Vapour pr. Of pure liquid B $\left(P_B^0\right)$ = 300 torr]
(A) 200 torr (B) 140 torr
(C) 180 torr (D) none of these

6. Boiling point of water is defined as the temperature at which-
(A) Vapour pressure of water becomes equal to that of atmospheric pressure
(B) Bubbles are formed
(C) Steam comes out
(D) None of the above

7. Calculate the mole fraction of toluene in the vapour phase which is in equilibrium with a solution of benzene and toluene having a mole fraction of toluene 0.50. The vapour pressure of pure benzene is 119 torr; that of toluene is 37 torr at the same temperature.
(A) 0.327 (B) 0.237
(C) 0.732 (D) 0.456

8. Benzene and toluene form two ideal solution A and B at 313 K. Solution A (total pressure P_A) contains equal mole of toluene and benzene. Solution B contains equal masses of both (total pressure P_B). The vapour pressure of benzene and toluene are 160 and 60 mm Hg respectively at 313K. Calculate the value of P_A/P_B.
(A) 0.694 (B) 0.496
(C) 0.964 (D) 0.732

9. The vapour pressures of ethyl alcohol and methyl alcohol are 45 mm Hg and 90 mm Hg. An ideal solution is formed at the same temperature by mixing 60g of C_2H_5OH with 40 g of CH_3OH. Total vapour pressure of the solution is approximately-
(A) 70mm (B) 35 mm
(C) 105 mm (D) 27 mm Hg

10. Consider two liquids A & B having pure vapour pressures P_A^0 & P_B^0 forming an ideal solution. The plot of $\frac{1}{X_A}$ v/s $\frac{1}{Y_A}$ (where X_A and Y_A are the mole fraction of liquid A in liquid and vapour phase respectively) is linear with slope and y intercepts respectively:

(A) $\frac{P_A^\circ}{P_B^\circ}$ and $\frac{\left(P_A^\circ - P_B^\circ\right)}{P_B^\circ}$

(B) $\frac{P_A^\circ}{P_B^\circ}$ and $\frac{\left(P_B^\circ - P_A^\circ\right)}{P_B^\circ}$

(C) $\frac{P_B^\circ}{P_A^\circ}$ and $\frac{\left(P_A^\circ - P_B^\circ\right)}{P_B^\circ}$

(D) $\frac{P_B^\circ}{P_A^\circ}$ and $\frac{\left(P_B^\circ - P_A^\circ\right)}{P_B^\circ}$

11. Mixture of volatile components A and B has total vapour pressure (in torr)
$P = 254 - 119\ X_A$
Where X_A is mol fraction of A in mixture. The values of p_A^0 and p_B^0 (in torr) are

(A) 254, 119 (B) 119, 254
(C) 135, 254 (D) 154, 119

12. At 25°C, the vapour pressure of pure liquid A (mol. mass = 40) is 100 torr, while that of pure liquid B is 40 torr, (mol. mass = 80). The vapour pressure at 25°C of a solution containing 20g of each A and B is:

(A) 80 torr (B) 59.8 torr
(C) 68 torr (D) 48 torr

ANSWERS

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

Note - If you have any query/issue

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