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121

Name of a student ----- Signature ----- No. 121

Mustansiriyah University
Department of Chemistry

2nd SEM-2026 Bologna Process
Mid_Exam_Class_A_Paper_A

01/MCO test (Answer the following)

(Marks 50 %)

1: Depression of freezing point of a solution associated an increasing in?

Answer: a) T b) H c) μ d) S

2: When applying the reduced phase rule to condensed systems, the pressure is assumed to be ----- atm?

Answer: a) zero b) 1 c) 2 d) 3

3: The reduced phase rule applies when which variable is kept constant?

Answer: a) T b) conc c) p d) χ

4: Which One of the following expressions represents a negative deviation from Raoult's law?

Answer: a) $P_A^* \neq \chi_A P_A^*$ b) $P_A = \chi_A P_A^*$ c) $P_A > \chi_A P_A^*$ d) $P_A < \chi_A P_A^*$

5: Addition of a non-volatile solute to a pure solvent results in a change in?

Answer: a) $\Delta_{mix}H$ b) $\Delta_{mix}S$ c) $\Delta_{mix}V$ d) all of these

6: The difference between pure and impure solvent is?

Answer: a) $\mu^* = \mu$ b) $\mu^* > \mu$ c) $\mu^* < \mu$ d) $\mu^* \neq \mu$

7: The relationship between ΔT_f and χ_B is?

Answer: a) direct b) inverse c) disordered d) none of these

8: With the two-component system (A & B), one part of the solid phase consists of?

Answer: a) A + B b) A + solution c) B + solution d) A + eutectic

9: If you add a solute to a pure solvent, then there is a decrease in the ----- of the solution.

Answer: a) S b) H c) T d) μ

10: Dalton's law is used to calculate the partial pressure of which phase?

Answer: a) liquid b) gas c) solid d) plasma

02 A solution contains 4.0 g of an unknown substance in 0.5 dm³ of solution. Its osmotic pressure is 103 torr at 34.0 °C. Calculate the molar mass of the unknown substance. (Marks 25%)

03 Using the diagram below and the appropriate phase rule, fill in all the blanks and determine the composition of the all-eutectic mixture, all equilibria, all reversible and irreversible processes, and the name of the regions located to the right and left of points C, E & AB? (Marks 25%)



Name of a student _____ Signature _____ No. _____

$R = 0.082 \text{ L}\cdot\text{atm}\cdot\text{mol}^{-1}\cdot\text{K}^{-1}$, $T = 307 \text{ K}$, $\pi =$

atm , $Wt = 4.0 \text{ g}$, $V = 0.9 \text{ dm}^3 = 1 \text{ L}$

$\pi = R T [B]$

$T_K = 34^\circ\text{C} + 273 = 307 \text{ K}$

$0.14 \text{ atm} = 0.082 \cdot 307 \cdot [B]$

$0.14 = 25.17 \text{ L}\cdot\text{mol}^{-1} [B]$

$[B] = \frac{0.14}{25.17 \text{ L}\cdot\text{mol}^{-1}} \Rightarrow [B] = 0.0055 \text{ M}$

$P_m = \frac{103 \text{ torr}}{760 \text{ torr}} = 0.14 \text{ atm}$

$\pi = 0.14 \text{ atm}$

$n = M \cdot V$

$n = 0.0055 \text{ mol/L} \times 0.5 \text{ L} \Rightarrow n = 0.00275 \text{ mol}$

$V = 1 \text{ L} = 1 \text{ dm}^3$
 $\frac{0.5 \text{ dm}^3}{1000 \text{ dm}^3} = 0.0005 \text{ L}$

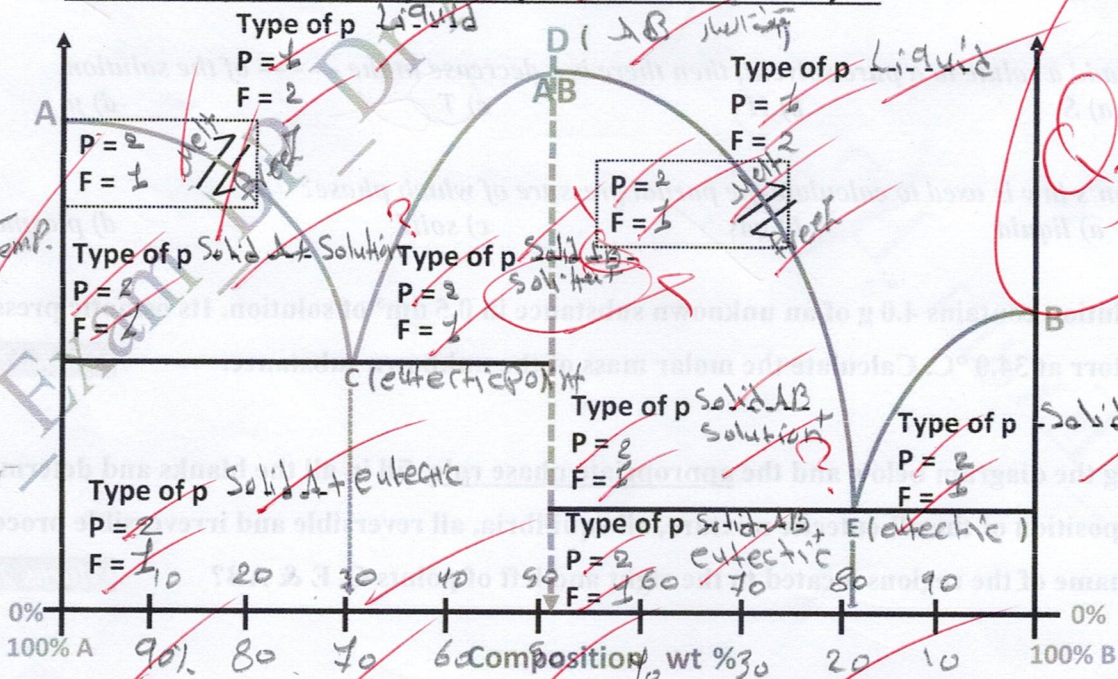
$n = \frac{Wt}{M.Wt} \Rightarrow M.Wt = \frac{Wt}{n} = \frac{4 \text{ g}}{0.00275 \text{ mol}} = 1454 \text{ g/mol}$

$M.Wt = 148 \text{ g/mol}$

$1 \text{ dm}^3 = 1 \text{ L}$

Q2
20
25

Two component system (Condensed)



$F = C - P + 1$

Q3
25
25

C (70% A, 30% B)

E (20% A, 80% B)

D (50% A, 50% B)