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No. 123

Physical_Chemistry_2nd_YUGS_EV_ST

Name of a student _____ Signature _____ No. _____

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%)



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$w_t = 4g / V = 0.5 dm^3 / \rho = 103 Torr / T = 34^\circ C / \text{molar mass} = ?$

$\rho (atm) = 103 Torr / 760 atm = 0.13 atm$

$T (K) = 34^\circ C + 273 K = 307 K$

$\rho = RT [B]$

$0.13 atm = 0.082 \frac{atm \cdot L}{K \cdot mol} \times 307 K \times [B]$

$0.135 = 25.174 L \cdot mol^{-1} \cdot [B]$

$[B] = \frac{0.135 atm}{25.174 atm \cdot L \cdot mol^{-1}} = 0.05 \frac{mol}{L}$

$[B] = \frac{n_B}{V} = 0.05 \frac{mol}{L} = \frac{n_B}{0.5 L} = 0.25 mol$

* التحويلات

$n_B = \frac{w_t}{\mu.wt}$

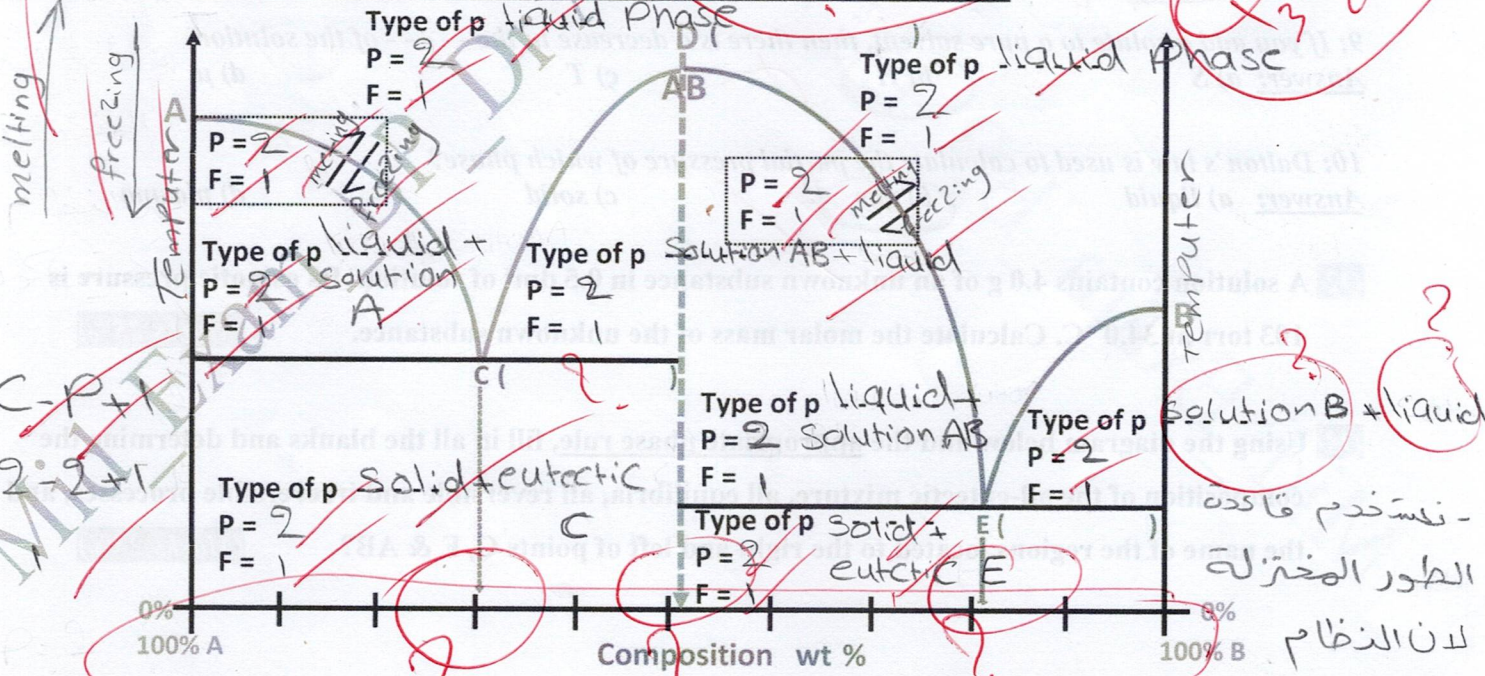
$0.25 mol = \frac{4g}{\mu.wt}$

$\mu.wt = \frac{4g}{0.25 mol}$

$\mu.wt = 16 g \cdot mol^{-1}$

$\mu.wt = 16 g \cdot mol^{-1}$

Two component system



$F = C - P + 1$
 $= 2 - 2 + 1$
 $= 1$

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نستخدم قاعدة الطور المختزلة لأن النظام ذو مكونين