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

Q1/ MCQ 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

Q2/ **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%)

Q3/ **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%)

Sun_05-04-2026 With my best wishes Dr Abduljabbar I. R. Rushdi

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Q2/

wt = 4.09 | V = 0.5 dm³ | P = 103 torr | T = 34.0 C

نحولة الى mL

$\frac{0.5}{1000} = 0.0005\ mL$

نحولة الى K

$T_K = T_C + 273 = 34.0 + 273 = 307\ K$

Wrong eq. ⇒ 0.52

$\text{molar mass} = \frac{m}{M} \Rightarrow \frac{8000\ g/mL}{31621\ torr/K} \Rightarrow 0.2529\ mol$

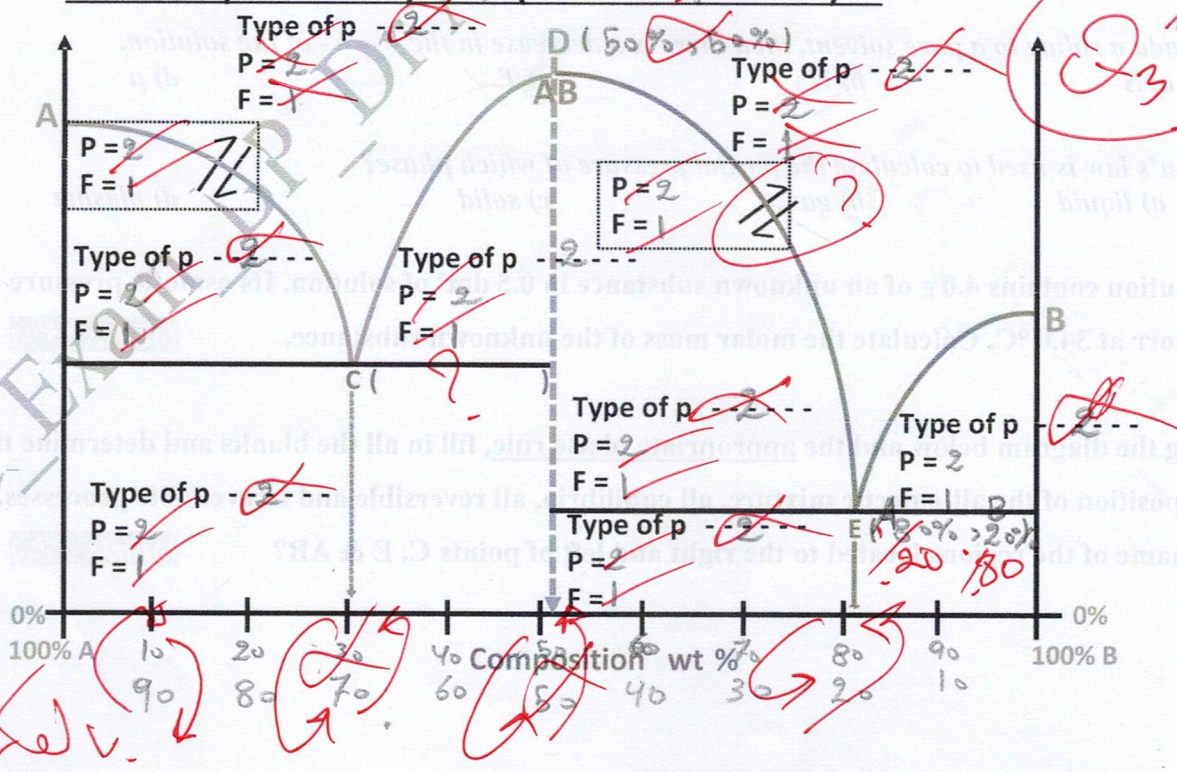
$m = \frac{wt}{V} \Rightarrow \frac{4.09}{0.0005\ mL} \Rightarrow 8000\ g/mL$

$M = P \times T \Rightarrow 103 \times 307 \Rightarrow 31621\ torr/K$

Q2 = 25

$dm^3 \equiv L$

Two component system ($F = C - P + 1$)



Q3 = 10/25