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

NO ANSWER, why

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 dm^3 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

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

$\pi \Rightarrow \frac{103}{760} \Rightarrow \pi = 0.1355$ atm , $w = 4.0\,g$, $V = 0.5\,L$

$T = 34.0 + 273$

$T = 307\,K$

$\pi = RT[A] \Rightarrow 0.1355 = 0.082 * 307K\,[A]$

$[A] = \frac{0.1355}{25.174} \Rightarrow [A] = 0.00538$

$[A] = \frac{n_A}{V} \Rightarrow n_A = [A] * V \Rightarrow n_A = 0.00538 * 0.5$

$n_A = 0.0269$ mol

$n = \frac{wt}{\text{molar mass}} \Rightarrow \text{molar mass} = \frac{wt(g)}{n(mol)}$

$\text{molar mass} = \frac{4.0\,g}{0.0269\,mol} \Rightarrow \text{molar mass} = 148.698\,g/mol$

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