Physical_Chemistry_2nd_YUGS_EV_ST

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

Mustansiriyah University
Department of Chemistry

2nd SEM-2025_Bologna_Process
Mid_Exam_Class_A_Paper_C

Q1/ MCQ test (Answer the following) (Marks 50 %)

1: Depression of freezing point of a solution means increasing in?
Answer: a) T b) H c) μ d) S

2: If you apply the reduced phase rule to condensed systems, then the expected value of pressure is ------?
Answer: a) zero b) 1 c) 2 d) 3

3: The reduced phase rule can be applied when the number of components is -------?
Answer: a) zero b) 1 c) 2 d) 3

4: Which One of the following formulas represents the right equation of 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 the pure solvent causes 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 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 --------- phase?
Answer: a) liquid b) gas c) solid d) plasma

Q2/ The Π of a solution containing 4.0 g of an unknown substance per 0.5 dm^3 of solution is 10^3 torr at 34.0 °C. Find the molar mass of this unknown. (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%)

Mo_17-03-2025 With my best wishes Dr Abduljabbar I. R. Rushdi

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Q12/ M.wt=? , $\Delta T = 34.0 + 273 = 307K$, $R = 0.082 K.mol^{-1}$, wt = 4.0 g

$\pi = R[B]T$

$500\ atm = 0.082\ atm\ K.mol[B]\ 307K$ (1 atm K^{-1} mol^{-1})

$[B] = \frac{500\ atm}{0.082\ atm\ L\ mol^{-1} \times 307K} = \frac{500}{25.174} = 19.86\ mol$

10^3 torr

Q2 15/25

$[B] = \frac{wt}{M.wt}$ $\frac{M}{V}$

$19.86 = \frac{4.0g}{M.wt} \Rightarrow M.wt = \frac{4.0}{19.86} = 0.2014\ g/mol$

Q3 Zero / 25

Two component system (?)