F29

Physical_Chemistry_2nd_YUGS_EV_ST

Name of a student ---------- Signature ---------- No. A6

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 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

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mole = V × M

= 0.5 dm³ ⇒ × 10⁻³ m³ × 4.0 g

mole = 2 × 10⁻⁶ g/m³

$\pi = R T [B]$

$R = 0.82 \frac{atm \cdot L}{mole \cdot K}$

$T = 34.0\,^{\circ}C \Rightarrow 34.0\,^{\circ}C + 273\,K = 307\,K$

$10.12 = 0.82 \frac{atm \cdot L}{mole \cdot K} \times 307\,K\,[B]$

$[B] = \frac{0.82 \frac{atm \cdot L}{mole \cdot K} \times 307\,K}{10.1} \Rightarrow \frac{251.74\ atm \cdot L/mole}{10.1}$

$= 24.924\ atm \cdot L/mole$

$mole = \frac{m.wt}{mole\ mass}$

$2\ g/m^3 = \frac{m.wt}{24.92\ atm \cdot L/mole}$

$= 49.84 \frac{atm \cdot L/mole}{g/m^3}$

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