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_B_Paper_A

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

1: The reduced phase rule is interested in two variants?
Answer: a) p & T b) F & T c) p & conc. d) T & conc.

2: Ideal solution follows - - - - - - - - - - law.
Answer: a) Raoult's b) Trouton's c) Henry's law d) Van't Hoff's law

3: The three phases of H_2O in the phase diagram meets?
Answer: a) at 1 atm b) over 1 atm c) below 1atm d) at any pressure

4: Liquid solution of HNO_3 is formed from?
Answer: a) 1 C b) 2 C c) 3 C d) 4 C

5: How many phases are there when the number of variants is zero and the number of components is one?
Answer: a) zero b) 1 c) 2 d) 3

6: The Clausius-Clapeyron equation can be applied when there is an equilibrium between one of the following?
Answer: a) L & L b) S & L c) G & L d) S & S

7: One of the following formulas represents the right equation of Henry's law?
Answer: a) $P_A = \chi_A P^*_A$ b) $P_A > \chi_A P^*_A$ c) $P_A < \chi_A P^*_A$ d) none of these

8: Molality is used to calculate the molar mass of the?
Answer: a) non-volatile solute b) pure solute c) pure solvent d) solution

9: Osmosis pressure exerts when the solvent transfers to the?
Answer: a) volatile solute b) non-volatile solute c) pure solvent d) solution

10- One of the most important benefits of measuring ΔVP, ΔT_b, ΔT_f and Π is to calculate - - - - - of B?
Answer: a) M b) m c) V d) p

Q2/ **The vapor pressure (VP) of a substance is 30 torr at 250 K. At what temperature will the substance have VP of 150 torr? $\Delta_{vap}H$ is 45 kJ mol^{-1}?** (Marks 25%)

Q3/ **Plot the phase diagram of the system (A & B) assumed that (A & B) do not react with each other. A freezes at (− 5 °C) and B freezes at (7 °C), and that an eutectic mixture is formed when the ratio is 70 wt % of A and that the eutectic melts at (− 10°C), then label all the parts (p & F) of the diagram?** (Marks 25%)

Thur_13-03-2025 **Best wishes** **Dr Abduljabbar I. R. Rushdi**

Q2/

$\Delta_{vap}H = 45 \times 1000$

$= 45000\ J\ mol^{-1}$

$T_1 = 250\ K$

$R = 8.314\ J\ K^{-1}\ mol^{-1}$

$$\ln \frac{P_f}{P_i} = \frac{\Delta_{vap}H}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

$$\ln \frac{150}{30} = \frac{45000\ J\ mol^{-1}}{8.314\ J\ K^{-1}\ mol^{-1}}\left(\frac{1}{T_2} - \frac{1}{250}\right) K^{-1}$$

$$e^5 = 5412.5\left(\frac{1}{T_2} - 0.004\right) K^{-1}$$

$$148.4 = 5412.5 - 21.65\ K^{-1}\ T_2^{-1}$$

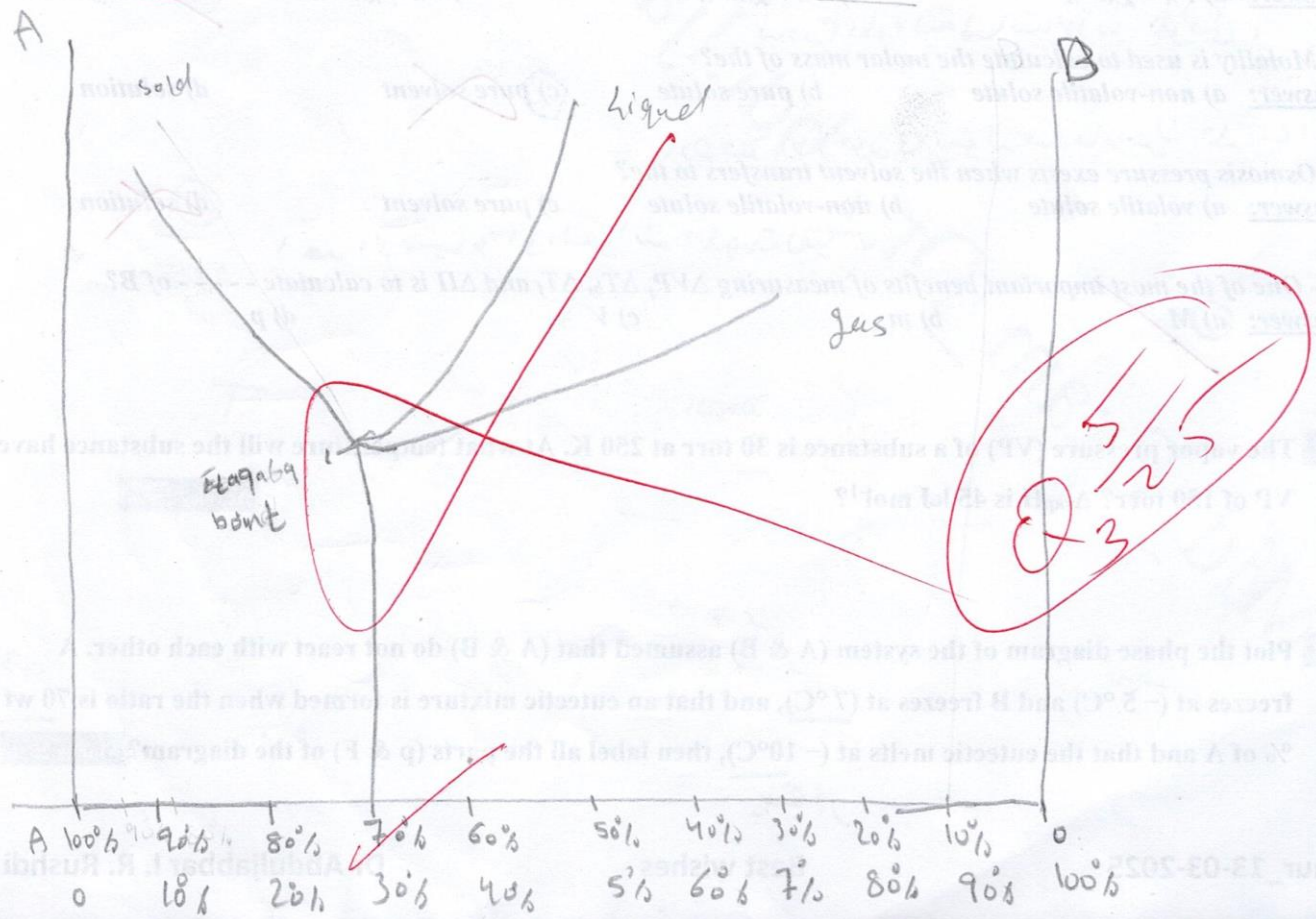
$$148.4 = \frac{5390.85}{T_2}\ K^{-1}$$

$$T_2 = \frac{5390.85}{148.4}\ K^{-1}$$

$T_2 = 36.32\ K$

? = units

Q2 15/25



Q3 5/25