



Zero Mid & Quize

Physical\_Chemistry\_2<sup>nd</sup>\_YUGS\_EV\_ST

Zero 100



Name of a student ----- Signature ----- No. 42

Mustansiriyah University  
Department of Chemistry

2<sup>nd</sup> 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<sub>2</sub>O 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<sub>3</sub> 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  $\Delta V_P$ ,  $\Delta T_b$ ,  $\Delta T_f$  and  $\Delta \Pi$  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<sup>-1</sup>?

(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%)

Q2

$P_i = 30 \text{ torr}, T_i = 25^\circ\text{K}, P_f = 150 \text{ torr}, T_f = ?$

$\Delta_{\text{vap}}H = 45 \text{ KJ mol}^{-1}$

\* نحدد  $T_f$  عند  $P_f = 150 \text{ torr}$

$\ln \frac{P_i}{P_f} = \frac{\Delta_{\text{vap}}H}{R} \left( \frac{1}{T_i} - \frac{1}{T_f} \right)$

$\ln \frac{30}{150} = \frac{45 \text{ KJ mol}^{-1}}{3.314 \text{ KJ mol}^{-1} \text{K}^{-1}} \left( \frac{1}{25} - \frac{1}{T_f} \right)$

$\ln 2 = \frac{45 \text{ KJ mol}^{-1}}{3.314 \text{ KJ mol}^{-1} \text{K}^{-1}} \left( \frac{1}{25} - \frac{1}{T_f} \right)$

$0.693 = 13.57 \left( 0.004 - \frac{1}{T_f} \right)$

$69.3 - 13.57 \left( 0.004 T_f \right)$

$55.73 = 0.004 T_f$

$T_f = \frac{55.73}{0.004} = 1393 \text{ K}$

Q3

