



P₂

50/100 Fifty only



Physical Chemistry 2nd YUGS_EV_ST

Name of a student

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Signature

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No. 2

Mustansiriyah University
Department of Chemistry

2nd SEM-2026_Bologna_Process
Mid_Exam_Class_A_Paper_C

Q1/MCO test (Answer the following)

(Marks 50 %)

المزيج العتدي يعني النسبة ما بين المكونات تكون

1: Eutectic mixture means that the ratio between two components is?

- Answer: a) (30-70) wt% b) (50-50) wt% c) (40-50) wt% d) none of these

2: Which law or equation is used to calculate the osmotic pressure of a dilute solution?

- Answer: a) Raoult's b) Trouton's c) Henry's law d) Van't Hoff's law

3: The three phases of H₂O 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 HNO₃ 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: If a non-polar solute is added to a non-polar solvent, the resulting solution is expected to obey which law?

- Answer: a) Van't Hoff's b) Raoult's c) -ve form Raoult's d) +ve form Raoult's

Q2/ If you were to make 0.800 m aqueous solution of glucose, what would be its boiling point and freezing point? ($K_b = 0.51 \text{ }^\circ\text{C/m}$, and $K_f = 1.86 \text{ }^\circ\text{C/m}$).

(Marks 25%)

ارم ذلك النظام يكون واه

Q3/ Draw the phase diagram of a one-component system and label each region and phase boundary with the number of phases (P), the degrees of freedom (F) according to the Gibbs phase rule, and indicate the type of equilibrium process along each line (reversible and irreversible process).

(Marks 25%)

Q2
 $b = 0.800 \text{ M}$
 $K_b = 0.51 \text{ }^\circ\text{C}/\text{M}$
 $K_f = 1.86 \text{ }^\circ\text{C}/\text{M}$

Q2
 $\frac{20}{25}$

convert $^\circ\text{C} \rightarrow \text{K}$

$\Delta T_b = K_b \cdot b$
 $\Delta T_b = 0.51 \text{ }^\circ\text{C}/\text{M} \times 0.800 \text{ M}$
 $\Delta T_b = 0.408 \text{ }^\circ\text{C}$

$\Delta T_b = T_b^{\text{solution}} - T_b^{\text{pure solvent}} \Rightarrow T_b^{\text{solution}} = T_b^{\text{pure solvent}} + \Delta T_b$
 $T_b^{\text{solution}} = 100.00 \text{ }^\circ\text{C} + 0.408 \text{ }^\circ\text{C}$
 $T_b^{\text{solution}} = 100.408 \text{ }^\circ\text{C}$

? \equiv Units

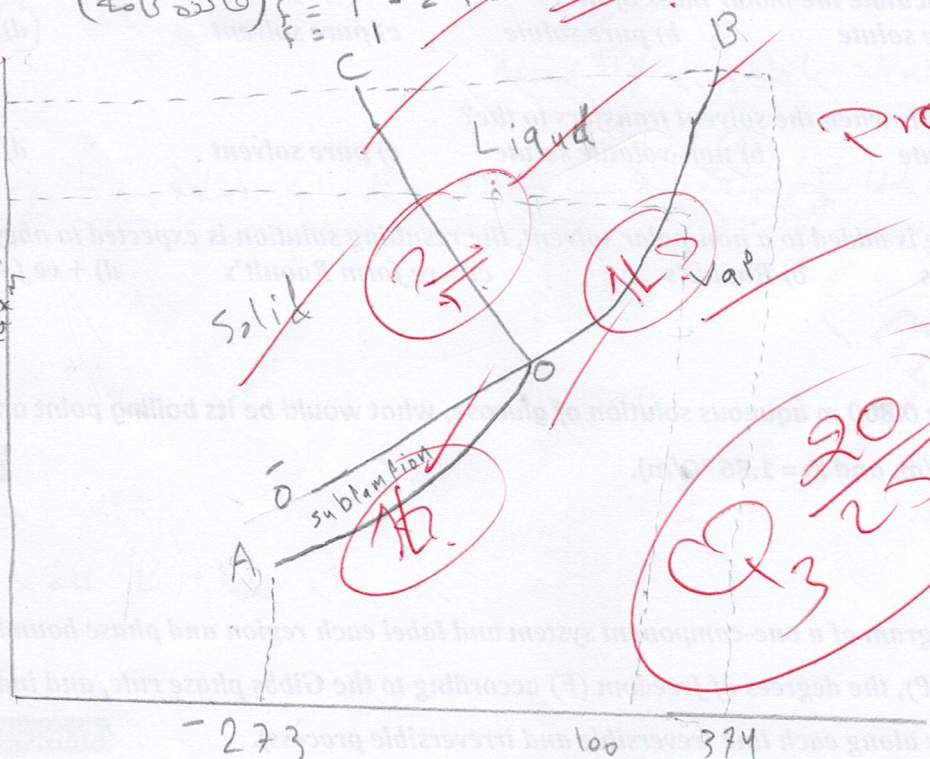
$\Delta T_f = K_f \cdot b$
 $\Delta T_f = 1.86 \text{ }^\circ\text{C}/\text{M} \times 0.800 \text{ M}$
 $\Delta T_f = 1.488 \text{ }^\circ\text{C}$

$\Delta T_f = T_f^{\text{pure solvent}} - T_f^{\text{solution}} \Rightarrow T_f^{\text{solution}} = T_f^{\text{pure solvent}} - \Delta T_f$
 $T_f^{\text{solution}} = 0.00 \text{ }^\circ\text{C} - 1.488 \text{ }^\circ\text{C}$
 $T_f^{\text{solution}} = -1.488 \text{ }^\circ\text{C}$

Q3/

$(\text{20/25}) \quad F = C - P + 2$
 $F = 1 - 2 + 2 = 1$

Area AOB
 $F = C - P + 2$
 $F = 1 - 1 + 2 = 2$
 (A) $F = C - P + 2$
 $F = 1 - 2 + 2 = 1$
 (O) $F = C - P + 2$
 $F = 1 - 3 + 2 = 0$



Processes?

Q3
 $\frac{20}{25}$

Temperature