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2nd SEM-2026_Bologna_Process
 Mid_Exam_Class_A_Paper_B

Q1/ MCQ test (Answer the following)

(Marks 50 %)

1: Which two variables does the Gibbs phase rule consider as independent??

Answer: a) p & T b) F & T c) p & conc. d) T & conc.

2: If NaCl is added to ice, which property of the solution decreases?

Answer: a) LP b) VP c) FP d) BP

3: At what pressure do the three phases of CO₂ coexist in the phase diagram?

Answer: a) at 1 atm b) over 1 atm c) below 1 atm d) at any pressure

4: Which phase corresponds to a supercooled substance?

Answer: a) gas b) liquid c) solid d) plasma

5: How many phases are present when a one-component system has two degrees of freedom?

Answer: a) zero b) 1 c) 2 d) 3

6: The Clausius equation can be applied to which of the following phase equilibria?

Answer: a) melt. & freeze. b) freeze. & melt. c) vap. & cond. d) all of these

7: What is the relationship between the VP of a solution and the solute molality?

Answer: a) direct b) inverse c) disordered d) none of these

8: Which type of solute, when added to a solvent, alters its colligative properties?

Answer: a) non-volatile solute b) volatile solute c) pure solute d) pure solvent

9: In osmosis, the solvent moves toward which component?

Answer: a) solute b) impure solute c) mixture d) pure solvent

10- One of the most important applications of measuring molar mass of the solute is to study the change in ---.

Answer: a) m b) Π c) V d) p

Q2/ 0.5 mol of a non-P-solute was added to 12.0 mol of P-solvent, VP^* is 12.0 kPa at 295 K. What is the VP at 295 K? Determine the deviation of this solution from Raoult's law where $VP_{ideal} = 10$ kPa. (Marks 25%)

Q3/ Plot the phase diagram of the system (α and β) assumed that (α and β) do not react with each other. α freezes at (-7°C) and β freezes at (10°C), and that a eutectic mixture is formed when the ratio is 30 wt % of β and that the eutectic melts at (-10°C), then label all the parts (p & F) of the diagram using the appropriate phase rule? (Marks 25%)

Q21

$$P_A = X_A \cdot P_A^*$$

$$P_A = \frac{12 \text{ mol}}{0.54 \text{ mol}} * 12 \text{ kPa}$$

$$Z_A = \frac{n_A}{n_A + n_B}$$

$$P_A = 288 \text{ kPa}$$

$$= 0.96 * 12 \text{ kPa} = 11.5 \text{ kPa}$$

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 $V_{PA} = 288 \text{ kPa} > V_{P_{idol}} = 10 \text{ kPa}$

$$P_{\text{solvent}} > P_{\text{idol}}$$

Q2 15/25

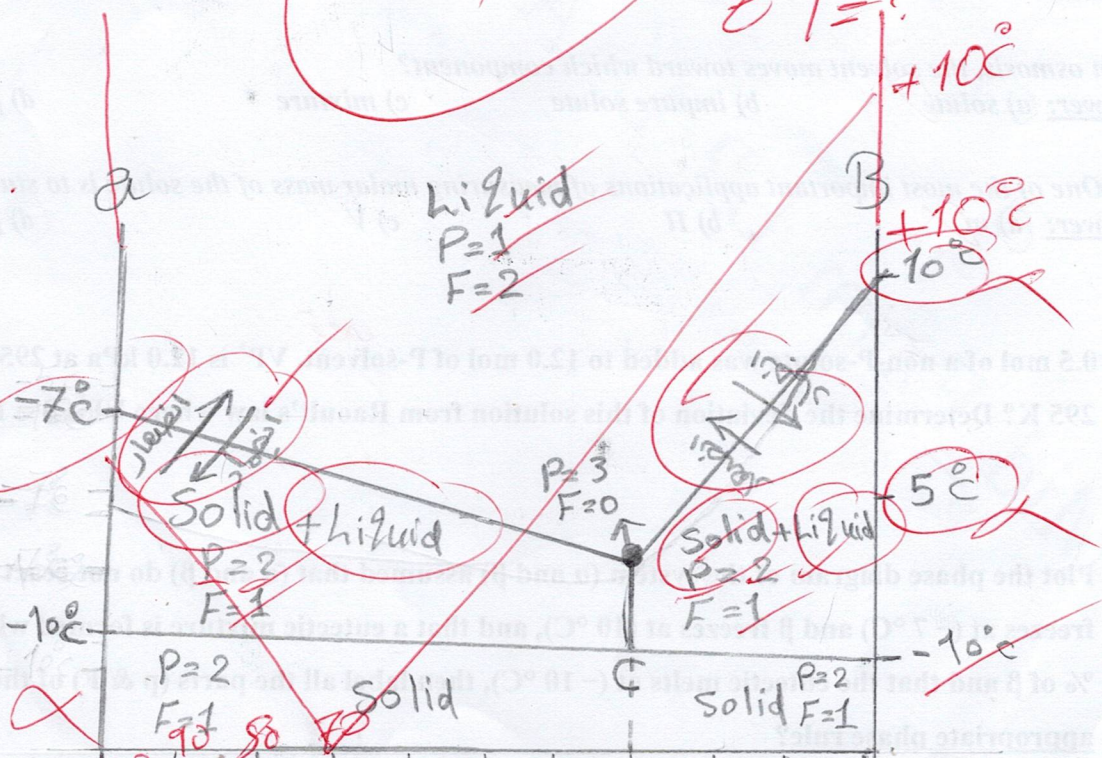
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Q31

Q3 10/25

E9 = ?

Handwritten notes in Persian script on the left side of the page.



100	10	20	30	40	50	60	70	80	90	100
100	40	80	70	60	50	40	30	20	10	0

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