



Name of a student hos lxs cma Signature [Signature] No. B1  
Mustansiriyah University 2<sup>nd</sup> SEM-2026\_Bologna\_Process  
Department of Chemistry 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 CO<sub>2</sub> 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. & freez.       b) frees. & 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)  $\Pi$        c)  $\gamma$       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<sub>ideal</sub> = 10 kPa. (Marks 25%)

**Q3/** Plot the phase diagram of the system ( $\alpha$  and  $\beta$ ) assumed that ( $\alpha$  and  $\beta$ ) do not react with each other.  $\alpha$  freezes at (-7 °C) and  $\beta$  freezes at (10 °C), and that a eutectic mixture is formed when the ratio is 30 wt % of  $\beta$  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%)

Q2/ non-P.S = 1 mol = 0.5 mol ~~F~~ P-solvent = 12 mol

$V P^* = 2 \text{ kPa}$   $T = 295 \text{ K}$   $V P = 295 \text{ K}$

Q2  $\frac{zero}{25}$

NO ANSWER why?

Q3

Q3  $\frac{5}{25}$

