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

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30/100  
Thurday



Name of a student \_\_\_\_\_ Signature \_\_\_\_\_ No. B11

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2<sup>nd</sup> SEM-2026\_Bologna\_Process  
Mid\_Exam\_Class\_A\_Paper\_B

عزير معقد

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

$F = 1 - P + 2$   
 $2 = 1 - P + 2$   
 $P = 1 + 2 - 2$

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) 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<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%)

