# Physical_Chemistry_2nd_YUGS_EV_ST

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

Mustansiriyah University
Department of Chemistry

2nd 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 $H_2O$ 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 $HNO_3$ 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 $\Delta VP$, $\Delta T_b$, $\Delta T_f$ 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 $mol^{-1}$? (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%)



Thur_13-03-2025 Best wishes Dr Abduljabbar I. R. Rushdi

Q2/

$$\ln\frac{P_2}{P_1} = \frac{-\Delta_{vap}H}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

$P_1 = 30\ torr$
$P_2 = 150\ torr$
$T_1 = 250\ K$
$\Delta_{vap} = 45\ KJ/mol$

$$\frac{150\ torr}{30\ torr} = -\frac{45\ KJ/mol}{8.314}\left(\frac{1}{T_2} - \frac{1}{250\ K}\right)$$

~~B~~

$$5 = -5.41\left(\frac{1}{T_2} - \frac{1}{250}\right)$$

$$5 = \frac{-5.41}{T_2} + \frac{5.41}{250}$$

$$5 = \frac{-5.41}{T_2} + 0.0216$$

$$5 - 0.0216 = \frac{-5.41}{T_2}$$

$$4.97 = \frac{-5.41}{T_2}$$

$$+T_2\ 4.97 = +5.41$$

$$T_2 = \frac{5.41}{4.97}$$

$$T_2 = 1.08\ K$$

Q2 5/5

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Q3/