P7

# Physical_Chemistry_2nd_YUGS_EV_ST

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

Mustansiriyah University
Department of Chemistry

2nd SEM-2026_Bologna_Process
Mid_Exam_Class_A_Paper_A

**Q1/ MCQ test (Answer the following)** (Marks 50 %)

**1: Depression of freezing point of a solution associated an increasing in?**
Answer: a) T b) H c) μ d) S

**2: When applying the reduced phase rule to condensed systems, the pressure is assumed to be - - - - - atm?**
Answer: a) zero b) 1 c) 2 d) 3

**3: The reduced phase rule applies when which variable is kept constant?**
Answer: a) T b) conc c) p d) χ

**4: Which One of the following expressions represents a negative deviation from Raoult's law?**
Answer: a) $P^*_A \neq \chi_A P_A$ b) $P_A = \chi_A P^*_A$ c) $P_A > \chi_A P^*_A$ d) $P_A < \chi_A P^*_A$

**5: Addition of a non-volatile solute to a pure solvent results in a change in?**
Answer: a) $\Delta_{mix}H$ b) $\Delta_{mix}S$ c) $\Delta_{mix}V$ d) all of these

**6: The difference between pure and impure solvent is?**
Answer: a) $\mu^* = \mu$ b) $\mu^* > \mu$ c) $\mu^* < \mu$ d) $\mu^* \neq \mu$

**7: The relationship between $\Delta T_f$ and $\chi_B$ is?**
Answer: a) direct b) inverse c) disordered d) none of these

**8: With the two-component system (A & B), one part of the solid phase consists of?**
Answer: a) A + B b) A +solution c) B + solution d) A + eutectic

**9: If you add a solute to a pure solvent, then there is a decrease in the - - - - - of the solution.**
Answer: a) S b) H c) T d) μ

**10: Dalton's law is used to calculate the partial pressure of which phase?**
Answer: a) liquid b) gas c) solid d) plasma

**Q2/** A solution contains 4.0 g of an unknown substance in 0.5 $dm^3$ of solution. Its osmotic pressure is 103 torr at 34.0 °C. Calculate the molar mass of the unknown substance. (Marks 25%)

**Q3/** Using the diagram below and the appropriate phase rule, fill in all the blanks and determine the composition of the all-eutectic mixture, all equilibria, all reversible and irreversible processes, and the name of the regions located to the right and left of points C, E & AB? (Marks 25%)

Mid_Exam_By_Dr_Abduljabbar I. R. Rushdi_2026

Sun_05-04-2026 With my best wishes Dr Abduljabbar I. R. Rushdi

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Q2/

$\Pi = RT[B]$

$0.135\,atm = 0.082\,\frac{L.atm}{mol.K} \times 307\,K\,[B]$

$25.174[B] = 0.135$

$[B] = 0.005$

$n.of\ mole = M*V = 0.005\,\frac{n}{L} * 500\,L = 2.5\,mole$

$n.of\ mole = \frac{wt}{n} = \frac{4.0\,g}{2.5\,mole} = 1.6\ g/mol$

$dm^3 = L$

$103\ torr / 760\ torr = 0.135\,atm$

$T_K = T_C + 273$

$T_K = 34 + 273\,K$

$T_K = 307\,K$

Mid_Exam_EP Dr Abduljabbar I. R. Rushdi 2026

**Two component system ( $F = C - P + 2$ )**