Physical_Chemistry_2nd_YUGS_EV_ST

Name of a student ---------- Signature ---------- No. 18

Mustansiriyah University
Department of Chemistry

2nd SEM-2025_Bologna_Process
Mid_Exam_Class_A_Paper_C

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

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

2: If you apply the reduced phase rule to condensed systems, then the expected value of pressure is ------?
Answer: a) zero b) 1 **c) 2** d) 3

3: The reduced phase rule can be applied when the number of components is -------?
Answer: a) zero b) 1 **c) 2** d) 3

4: Which One of the following formulas represents the right equation of 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 the pure solvent causes 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 ΔT_f and χ_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 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 ---------- phase?
Answer: **a) liquid** b) gas c) solid d) plasma

Q2/ The Π of a solution containing 4.0 g of an unknown substance per 0.5 dm^3 of solution is 10^3 torr at 34.0 °C. Find the molar mass of this unknown. (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%)

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

Q2 $\pi = RT[B] \Rightarrow [B] = \frac{\pi}{RT}$

$[B] = \frac{1.3157\ atm}{0.082\ atm.L/K.mol * 307K}$

$= \frac{1.3157}{25.174} \Rightarrow [B] = 0.0522\ mol/L$

Q2 20/25

Wt(A) = 4.0 g

$\pi = 10^3\ torr \div 760$

$\pi = 1.3157\ atm$

$T = 34.0^{\circ}C + 273 = 307\ K$

$V = 0.5\ dm^3 = 0.0005\ L$

$dm^3 = L$

$R = 0.082\ atm.L/K.mol$

No. of moler = [B] * V

$= 0.0522\ mol/L * 0.0005\ L \Rightarrow$ No. of moler = 0.00261 mol

0.5L

Molar mass = $\frac{Wt}{No.\ of\ moler} = \frac{4.0\ g}{0.00261\ mol}$

Molar mass = 1532.567 g/mol

Q3 10/25

$F = C - P + 1$ ⇐ Two component system (قاعدة الطور المختزلة)