Name of a student ----- زهراء عبد علي هادي _ Zahraa Abed Ali Hadi ----- Signature ----- ----- No. --16

Mustansiriyah University
Department of Chemistry

2nd SEM-2025_Bologna_Process
Mid_Exam_Class_A_Paper_C

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

اكفاءانه رطب كفاءانحلول بعتد زاما دكي

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?

$I = RTB$

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 dm³ of solution is 10^3 torr at 34.0 ºC. 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%)*

Mo_17-03-2025   *With my best wishes*   Dr Abduljabbar I. R. Rushdi

Physical_Chemistry_2ⁿᵈ_YUGS_EV_ST

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Same unit = L

$Wt = 4.0 g$, $V = 0.5 dm^3 = \dfrac{0.5}{1000} = 0.0005$

$\Pi = 10^3 torr : \dfrac{\times 10^3}{760} = 760 \times 10^3$

$T = 34.0 C \rightarrow K \quad 34 + 273 = 271 K \quad (307 K)$

$\Pi = RT[B]$

$760 \times 10^3 = 0.0816 \times 271 [B] =$

$760 \times 10^{-3} = 22.11 [B]$

$B = 34.37$?

$Q_2 \quad \dfrac{15}{25}$

$n.\,of\,meq = N.V$

$= 34.37 \times 5 \times 10^{-4}$

$= 171.8 \times 10^{-4}$

$171.8 \times 10^{-4} = \dfrac{4.0}{molar\,mass} =$?

$Q_3 \quad \dfrac{10}{25}$

$F = C - P + 1 = 2 - 2 + R = R$ → For what?

Two component system (?)

Type of p - - - - -
P = 2
F = 1

1 - 2 + 1 =

A
P = 1
F = 2

Type of p Solid + Liquid
P = 2
F = 1

Type of p Liquid (soln)
P = 1
F = 2

D
AB
Type of p Sol·d
P =
F =

P = 1
F = 2

Type of p
P =
F =

C ( )

Type of p - - - - -
P = 1
F =

B

Type of p Solid
P =
F =

Type of p - - - - -
P = 1
F = 1

Type of p Liquid
P = 1
F = 1

E ( )

0%   100% A   90A 80A 70A 60A Composition wt % 50A 40A 30A 20A 10A   100% B   0%
100% A   100% B
          0B   10B   20B   30B   40B   50B   60B   70B   80B   90B