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P5

Fifty only  
05-04-2026  
Sun 7/4/26

50  
100  
A16

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

Name of a student

طیبة عبد وکعب کاظمی

Signature

No.

A16

Mustansiriyah University  
Department of Chemistry

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

Q1/MCO test (Answer the following)

(Marks 50%)

1: Depression of freezing point of a solution associated an increasing in?

Answer: a) T b) H c)  $\mu$  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)  $\chi$

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)  $\mu$

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<sup>3</sup> of solution. Its osmotic pressure is 103 torr at 34.0 °C. Calculate the molar mass of the unknown substance. (Marks 25%)

وزن مادة مجهولة  
حجم المحلول

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. \_\_\_\_\_

$\pi = RT[B]$

$T(K) = 273 + 34.0(C)$   
 $= 307 K$

$0.135 \text{ atm} = 0.082 \text{ atm L/mol K} \times 307 K [B]$

$\pi = 10 \text{ atm}$   
 $14 \text{ mm Hg} = 760 \text{ torr}$   
 $\pi = 0.135 \text{ atm}$

$[B] = \frac{0.135}{25.17 \text{ L/mol}}$

$V = \dots$

$[B] = 0.053 \text{ L/mol mol/L OR mol L}^{-1}$

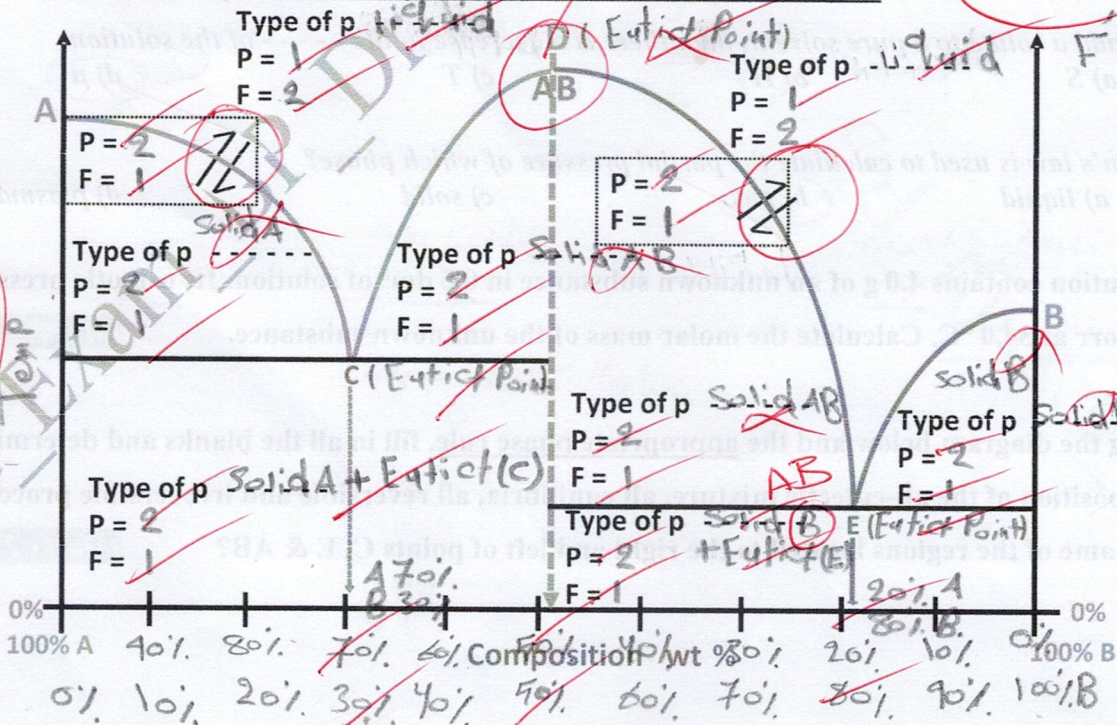
No. of moles =  $M \times V = 0.053 \text{ L/mol} \times 500 \text{ mL}$   
 $= 26.5 \text{ mol}$

No. of molar mass =  $\frac{W}{\text{No. of moles}}$   
 $= \frac{4.08}{26.5 \text{ mol}}$   
 $= 0.1538 \text{ g/mol}$

Q 1/25

Q 2/25

Two component system



Melting  
Freezing  
Temp

Melting Point

Q 3/25