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P10

Physical Chemistry 2nd YUGS EV-ST

05/04/2026
Abduljabbar

60/100 Sixty only



Name of a student ----- Signature ----- No. B10

Mustansiriyah University
Department of Chemistry

2nd SEM-2026 Bologna Process
Mid Exam Class A Paper B

Q1/ MCQ test (Answer the following)

قوة حرارية
قادرة

ما هي تغيرات في خواص سائل عند التجميد

(Marks 50 %)

35/50 Q. 50

1: Which two variables does the Gibbs phase rule consider as independent??

Answer: a) p & T b) F & T c) p & conc. d) T & conc.

2: If NaCl is added to ice, which property of the solution decreases?

Answer: a) LP b) VP c) FP d) BP

مبلغ ضغط متنازل

انقراض فقط لتغير الطور - CO₂

3: At what pressure do the three phases of CO₂ coexist in the phase diagram?

Answer: a) at 1 atm b) over 1 atm c) below 1 atm d) at any pressure

4: Which phase corresponds to a supercooled substance?

Answer: a) gas b) liquid c) solid d) plasma

$$F = 2 \\ P = 1$$

$$F = 1 - P$$

5: How many phases are present when a one-component system has two degrees of freedom?

Answer: a) zero b) 1 c) 2 d) 3

$$F = 2 - P + 1 \\ 2 = 2 - P + 1 \\ 4$$

6: The Clausius equation can be applied to which of the following phase equilibria?

Answer: a) melt. & freez. b) frees. & melt. c) vap. & cond. d) all of these

7: What is the relationship between the VP of a solution and the solute molality?

Answer: a) direct b) inverse c) disordered d) none of these

8: Which type of solute, when added to a solvent, alters its colligative properties?

Answer: a) non-volatile solute b) volatile solute c) pure solute d) pure solvent

9: In osmosis, the solvent moves toward which component?

Answer: a) solute b) impure solute c) mixture d) pure solvent

10- One of the most important applications of measuring molar mass of the solute is to study the change in ---.

Answer: a) m b) Π c) V d) p

Q2/ 0.5 mol of a non-P-solute was added to 12.0 mol of P-solvent, VP* is 12.0 kPa at 295 K. What is the VP at 295 K? Determine the deviation of this solution from Raoult's law where VP_{ideal} = 10 kPa. (Marks 25%)

mol \rightarrow L

$$P_A = X_A$$

$$\frac{10 \times 1 \text{ atm}}{260}$$

Q3/ Plot the phase diagram of the system (α and β) assumed that (α and β) do not react with each other. α freezes at (-7 °C) and β freezes at (10 °C), and that a eutectic mixture is formed when the ratio is 30 wt % of β and that the eutectic melts at (-10 °C), then label all the parts (p & F) of the diagram using the appropriate phase rule?

(Marks 25%)

Q2

$\frac{0.5}{25}$

$P_A = X_A \cdot P_A^*$

$k P_A$

$P_A = 0.4 \times 12$

$P_A = 4.8$

$V_{P_{real}} < V_{P_{ideal}}$

$P_A = 4.8 < 10 P_{ka} P$

قانون غاف

$X_A = \frac{n}{M}$

$X_A = \frac{0.5 \text{ mol}}{18 \text{ mol}} = 0.027$

بدون و بدون سر موی

$\Delta X_A = \frac{n_A}{n_T}$

$= \frac{n_A}{n_A + n_B}$

$= \frac{12 \text{ mol}}{12 \text{ mol} + 0.5 \text{ mol}}$

$= 0.96$

حالت گازی
تأثیرات کوچک

تأثیرات کوچک

Q3

liquid A + liquid B (solution)

$\frac{20}{25}$

$P=1$
 $F=2$

Temperature

Freezing
melting

$0^\circ C$

$-2^\circ C$

Solid A + liquid A + liquid B
 $P=2$ $F=1$

Solid A + eectic
 $P=2$ $F=1$

liquid B
 $P=1$ $F=2$

Solid B + liquid A + liquid B
 $P=2$ $F=1$

Solid B + eectic
 $P=2$ $F=1$

Freezing
melting

درجه انجماد
 $c - 10 - \text{درجه انجماد}$
eectic

$\% 70 = A$

$\% 30 = B$

$F = C - P + 1$

100 90 80 70 60 50 40 30 20 10 0

0 10 20 30 40 50 60 70 80 90 100 B

Comp