Physical_Chemistry_2nd_YUGS_EV_ST

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

Mustansiriyah University

Department of Chemistry

2nd SEM-2025_Bologna_Process

Mid_Exam_Class_B_Paper_A

Q1/ MCQ test (Answer the following)

(Marks 50 %)

قاعدة الطور المختزل غاربوعين تهم

1: The reduced phase rule is interested in two variants?

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

المحلول المثالي يخضع قانون محلول مثل

2: Ideal solution follows - - - - - - - - - law.

Answer: a) Raoult's   b) Trouton's   c) Henry's law   d) Van't Hoff's law

الطور الثالث للماء تلتقي

3: The three phases of H_2O in the phase diagram meets?

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

يتكون من

4: Liquid solution of HNO_3 is formed from?

Answer: a) 1 C   b) 2 C   c) 3 C   d) 4 C

بما يحدد عدد الطور لنظام تكون قيد

5: How many phases are there when the number of variants is zero and the number of components is one?

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

معادله كل يمكن تطبيقها لنظام التوازن

6: The Clausius-Clapeyron equation can be applied when there is an equilibrium between one of the following?

Answer: a) L & L   b) S & L   c) G & L   d) S & S

احدهم ممثل قانون هنري كي

7: One of the following formulas represents the right equation of Henry's law?

Answer: a) $P_A = \chi_A P^*_A$ b) $P_A > \chi_A P^*_A$ c) $P_A < \chi_A P^*_A$ d) none of these

نفضر المولايه لحساب جزيء ل شي

8: Molality is used to calculate the molar mass of the?

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

الضغط الازموزي عندما ينتقل الى

9: Osmosis pressure exerts when the solvent transfers to the?

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

احد الاحسام العوامل لقياس راك

10- One of the most important benefits of measuring ΔVP, ΔT_b, ΔT_f and $\Delta \Pi$ is to calculate - - - - - of B?

Answer: a) M   b) m   c) V   d) p

Q2/ The vapor pressure (VP) of a substance is 30 torr at 250 K. At what temperature will the substance have VP of 150 torr? $\Delta_{vap}H$ is 45 kJ mol^{-1}?

(Marks 25%)

رسم مخطط الطور A&B, المادة A تنجمد عند I- ومادة B تنجمد عند 7 تنجمد المزيج الصهري

Q3/ Plot the phase diagram of the system (A & B) assumed that (A & B) do not react with each other. A freezes at (− 5 °C) and B freezes at (7 °C), and that an eutectic mixture is formed when the ratio is 70 wt % of A and that the eutectic melts at (− 10°C), then label all the parts (p & F) of the diagram? (Marks 25%)

يتكون من 70% A من 30% B بتصهر عند درجه الحرارة -

Thur_13-03-2025   Best wishes   Dr Abduljabbar I. R. Rushdi

Q21 $P_f = 30$ torr $P_i = 150$ torr $T_f = 250\,K$ $\Delta vapH = 45\ Kg\,mol^{-1}$

$$Ln\frac{P_f}{P_i} = -\frac{\Delta vapH's}{R}\left(\frac{1}{T_f} - \frac{1}{T_i}\right)$$

$? \equiv Units$

$$Ln\frac{30\ ?}{150\ ?} = -\frac{45\ ?}{8.13\alpha\nu}\left(\frac{1}{250\ ?} - \frac{1}{T_i}\right)$$

$T_f = 250\,?$

$$Ln\frac{30}{150} = -5.53\left(\frac{1}{250} - \frac{1}{T_i}\right)$$

$$Ln\,0.2 = -5.53\left(\frac{1}{250} - \frac{1}{T_i}\right)$$

$$Ln\,0.2 = \frac{-5.53}{250} + \frac{5.53}{T_i}$$

$$-1.6 = \frac{-5.53}{250} + \frac{5.53}{T_i}$$

$$\frac{5.53}{T_i} = \frac{-5.53}{250} + 1.6$$

$$T_i = \frac{\frac{-5.53}{250} + 1.6}{5.53}$$

$$\boxed{= 0.28\ K}$$

Q2   A   B

3C   Liued + Sution   7C

$F=2$

Solid A   Solid B
+ Sution   + Sution

$F=2$ $F=0$ $F=2$

c

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