



Physical Chemistry 2nd YUGS EV ST



Name of a student _____ Signature _____ No. _____

Mustansiriyah University
Department of Chemistry

1st SEM-2025 Bologna Process
Mid Exam Class A Paper B

Q1: Circle the right answer for all of the following

(50 Marks)

1: Liquification of the gas means which of the following?

- (a) $pV_m = nRT$
- (b) $pV_m < nRT$
- (c) $pV_m > nRT$
- (d) $pV_m \neq nRT$

2: What is the right formula that can be used for calculating the mole fraction of the gas in a mixture?

- (a) V/n
- (b) n/V
- (c) V/m
- (d) n_i/n_T

3: A real gas behaves like an ideal gas, when which of the following is true?

- (a) $pV_m/RT = 1$
- (b) $pV_m/RT \neq 1$
- (c) $pV_m/RT < 1$
- (d) $pV_m/RT > 1$

4: Heat energy transfer can be measured by which of the following?

- (a) thermometer
- (b) closed system
- (c) heat capacity
- (d) calorimeter

5: An isobaric process means which of the following?

- (a) $\Delta T = 0$
- (b) $\Delta p = 0$
- (c) $C_v \Delta T = 0$
- (d) $C_p \Delta T = 0$

6: The unit of C_p/C_v is:

- (a) $J mol^{-1} K^{-1}$
- (b) $J g^{-1} K^{-1}$
- (c) $J mol^{-1} ^\circ C^{-1}$
- (d) none of these

7: When the process cannot compensate the loss of q, then we can call it:

- (a) isothermal
- (b) adiabatic
- (c) isobaric
- (d) isochoric

8: When the system is completely isolated, then ΔH can be calculated by which of the following?

- (a) $p_{ex} \Delta V$
- (b) $nRT \ln V_f/V_i$
- (c) $C_p \Delta T$
- (d) ΔVU

9: $C_p > C_v$ due to which of the following?

- (a) ΔU
- (b) Q
- (c) ΔH
- (d) R

10: When the process is reversible and $p_{in} > p_{ex}$, the process is called:

- (a) isochoric
- (b) isothermal
- (c) isobaric
- (d) exothermic

Q2: Calculate the density of an unknown gas with a molar mass of $40 g mol^{-1}$ at STP conditions. (25 points)

Q3: A diatomic ideal gas is compressed reversibly and adiabatically at T_i of $67^\circ C$ to T_f of $450 K$. Calculate

- (a) work was performed?
- (b) ΔU ,
- (c) q and
- (d) ΔH .

(25 Marks)

Q2/ $d = ?$, غاز مجهول , $M = 40 \text{ g mol}^{-1}$, STP

ظروف قياسية

$P = 1 \text{ atm}$
 $V = 22.4 \text{ L}$
 $T = 273 \text{ K}$

~~$PV = nRT$~~

~~$PV = \frac{m}{M}RT \rightarrow PM = \frac{m}{V}RT \rightarrow PM = dRT$~~

~~$d = \frac{PM}{RT} \rightarrow d = \frac{1 \text{ atm} \times 40 \text{ g mol}^{-1}}{0.082 \text{ atm} \cdot \text{L mol}^{-1} \cdot \text{K}^{-1} \times 273 \text{ K}}$~~

~~$d = \frac{40 \text{ g}}{22.386 \text{ L}} \rightarrow d = 1.786 \text{ g/L}$~~

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Q3/ نظام اديباتيكي $\textcircled{1} W = ?$, $\textcircled{2} \Delta U = ?$, $\textcircled{3} q = ?$, $\textcircled{4} \Delta H = ?$

$T_1 = 67^\circ \text{C}$, $T_2 = 450 \text{ K}$, $\rightarrow T_1 = 67 + 273 = 340$

$\Delta T = T_2 - T_1 \rightarrow \Delta T = 450 \text{ K} - 340 \text{ K} \rightarrow \Delta T = 110 \text{ K}$

Where is the eq!o ?

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