



Physical Chemistry 2nd - YUGS EV ST



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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/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 .

$\Delta V = q - w$

$\Delta H =$

$\Delta H, q, \Delta U$

Q2) $d = ?$, $(T = 273, P = 1 \text{ atm})$ STP

$M = 40 \frac{\text{g}}{\text{mole}}$

Where is the ~~(ed)~~ law?

$d = \frac{T_k + M \text{ g/mol}}{P_{\text{atm}}} \Rightarrow \frac{273 \text{ K} + 40 \text{ g/mol}}{1 \text{ atm}}$

$d = \frac{PV}{RT}$

~~$d = 273 + 40 = 109200$~~

5/25
Q2

Q3) $\Delta U = ?$, $\Delta H = ?$, $q = ?$, $w = ?$

$\Delta U = nR\Delta T$ **Heat Energy**

$\Delta U = 0.82 * 110 \text{ (K)}$

$\Delta U = 0.82 * 11 \Rightarrow \Delta U = 9.02$

$\Delta H = \Delta U + P\Delta V \Rightarrow \Delta H = \Delta U$

$\Delta H = 9.02$

$q = 0$ **why?**
~~Energy~~

$w = q - \Delta U \Rightarrow w = -\Delta U \Rightarrow w = -9.02$

~~$T_i = 67^\circ\text{C} + 273 \text{ K}$~~

~~$T_i = 340 \text{ K}$~~

~~$T_f = 450 \text{ K}$~~

~~$\Delta T = T_f - T_i \text{ K}$~~

~~$\Delta T = 450 - 340 \text{ K}$~~

~~$\Delta T \text{ K} = 110 \text{ K}$~~

5/25
Q3