



Physical Chemistry 2nd YUGS EV ST

نورالهدى زهراء رشدي

P37
3

50/100 Fifty only



Name of a student Signature No. 24

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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_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)

$Q_2 \equiv \text{Units}$

Q2 $M = 40 \text{ (g mol}^{-1}\text{)}$ $P = 1 \text{ atm}$ $R = 0.082$ $T = 25 + 273$
 $T = 298 \text{ K}$

~~$PV = nRT$~~

~~$PV = \frac{m}{M} RT$~~

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

$Q_2 \frac{20}{273}$

~~$d = \frac{1 \times 40}{0.082 \times 273} = \frac{40}{22.436} = 1.7836$~~

Q3 $T_i = 67^\circ\text{C} + 273$ $T_f = 450 \text{ K}$ $\Delta T = 450 - 340 = 110 \text{ K}$
 $= 340 \text{ K}$

$\Delta U = q +$

$\Delta U = 1 +$

Q_3
 25
 450

NO ANSWER, why?