

F8

25/100 Twenty five

1.25



Physical_Chemistry_2nd_YUGS_EV_ST

Name of a student _____ Signature _____ No. A12

Mustansiriyah University
Department of Chemistry
1st SEM-2025_Bologna_Process
Mid_Exam_Class_A_Paper_A

Q1: Circle the right answer for all of the following (50 Marks)

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

- (a) $Z = 1$ (b) $Z > 1$ (c) $Z < 1$ (d) $Z \neq 1$

2: In the van der Waals equation, what is the correct formula for the volume of the gas?

- (a) n/nT (b) V (c) V/m (d) V/n

3: If a gas has polar particles, then the difference between the volume of this gas is:

- (a) $V_{Real} > V_{Perfect}$ (b) $V_{Real} < V_{Perfect}$ (c) $V_{Real} = V_{Perfect}$ (d) $V_{Real} \neq V_{Perfect}$

4: It can classify the type of reaction within adiabatic process as:

- (a) reversible (b) isobaric (c) isothermal (d) free expansion

5: If it is required to measure the work done in an isochoric process, the value of work will be:

- (a) zero (b) one (c) two (d) three

6: In a completely insulated system, the work done is in contact with which of the following?

- (a) gas (b) system (c) surrounding (d) pressure

7: When the internal pressure of the system is equal to atmospheric pressure, the actual value will be:

- (a) zero (b) one (c) two (d) three

8: During an isothermal reversible process, the change in temperature of the system is?

- (a) variable (b) equal to zero (c) $25^{\circ}C$ (d) constant

9: Heat capacity is extensive property while molar heat capacity is _____ property:

- (a) proportional (b) intensive (c) extensive (d) direct

10: When $\Delta H = 0$, the process is:

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

Q2: Using van der Waals equation, calculate the temperature of 5.0 mol of an unknown gas in a 5.0 L container at 80 bar. Compare this temperature with the value obtained from the ideal gas equation.

$a = 0.0341 \text{ L}^2 \text{ atm mol}^{-2}; b = 0.0237 \text{ L mol}^{-1}$

(25 Marks)

Q3: 1100 J of heat energy was applied to (50 g, 27 g mol^{-1}) of aluminum metal. The temperature increased from $25^{\circ}C$ to $45^{\circ}C$. Calculate $C_{p,m}$ of aluminum. (25 Marks)

Thu_11-12-2025

Best wishes

Dr Abduljabbar I. R. Rushdi

Q2 / $P = 80 \quad V = 5L \quad n = 5 \quad R = 0.082$

~~$PV = nRT$~~

~~$(80 * 5L) = (5)(0.082) T$~~

? \equiv Units

~~$400 = 0.41 T$~~

~~$T = \frac{400}{0.41} \Rightarrow T = \frac{4}{41} = 7T = 10.25^\circ C$~~

$Q_2 \frac{10}{25}$

$T = 10.25 K$

~~$PTV = nRT \left(\frac{V_f}{V_i} \right)^{\frac{\gamma}{\gamma-1}}$~~

~~$80 * 5 = 5(0.082(T)) \left(\frac{0.0341L}{0.0237L} \right)^{\frac{2}{1}}$~~

~~$400 = 0.41 T$~~

Q3 / $T_i = 25^\circ C \quad T_f = 45^\circ C$

$\Delta M = m_f - m_i$

$\Delta T = T_f - T_i = 27 - 50 = 318 - 298 = 20$

$T_{i5} = 25^\circ C + 273 = 298 K$

$T_{f5} = 45^\circ C + 273 = 318 K$

$q_p = n C_{p,m} \Delta T$

~~$G = q * \Delta T \Rightarrow G = -253 * 20$~~

$q = E * \Delta M$

$G = -5060$

$q = 1100 J * -23$

$q = -25300$

$Q_3 \frac{5}{25}$