



Physical_Chemistry_2nd_YUGS_EV_ST



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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/n_f (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) $V_{\text{Real}} > V_{\text{Perfect}}$ (b) $V_{\text{Real}} < V_{\text{Perfect}}$ (c) $V_{\text{Real}} = V_{\text{Perfect}}$ (d) $V_{\text{Real}} \neq V_{\text{Perfect}}$

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°C (d) constant

9: Heat capacity is extensive property while molar heat capacity is ~~proportional~~ property:

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

10: When $\Delta H = \text{zero}$, 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°C to 45°C . Calculate $C_{p,m}$ of aluminum.

(25 Marks)

Thu_11-12-2025

Best wishes

Dr Abduljabbar I. R. Rushdi

$$q = 1100 \text{ J} \quad w = 50 \text{ g} \quad m.w = 27 \text{ g mol}^{-1} \quad 1 \text{ L}$$

$$\Delta T = T_f - T_i = 45 - 25 = 20 + 273 = 293 \text{ K}$$

$$q_p = n C_{p,m} \Delta T \rightarrow q_p = \frac{w}{m.w} n$$

$$C_{p,m} = \frac{q_p}{n \Delta T} = \frac{1100}{(1.85)(293)}$$

$$C_{p,m} = \frac{1100}{542.05} = 2.029 \text{ J mol}^{-1} \text{ K}^{-1}$$

$$T = ? \quad n = 5 \text{ mol} \quad V = 5 \text{ L} \quad p = 80 \text{ atm}$$

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

van der Waals equation

Q3 15/25

Q2 NO ANSWER, Why?

Q2 zero 25