



1.5 / 5

F13

30 / 100 Thirty only

Physical_Chemistry_2nd_YUGS_EV_ST



Name of a student A Signature No. 11

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_i/n_T
- (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°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 $\Delta H = \text{zero}$, 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)

Q11 $n = 5.0 \text{ mol}$ $V = 5.0 \text{ L}$ $P = 8.0 \text{ atm}$ $a = 0.034 \text{ L atm mol}^{-1}$

$b = 0.0237 \text{ L mol}^{-1}$

~~$PV = nRT$~~

~~$T = \frac{PV}{nR}$~~

~~$T = \frac{8.0 \text{ atm} \times 5.0 \text{ L}}{5.0 \times 0.082 \text{ L atm K mol}^{-1} \text{ K}} = 0.656 \text{ K}$~~

Q_2

1st answer?

Q20 $q = 1100 \text{ J}$ $T_i = 25^\circ \text{C}$ $T_f = 45^\circ \text{C} \rightarrow T_i = 25^\circ \text{C} + 273 =$

~~$T_i = 298 \text{ K}$ $T_f = 45^\circ \text{C} + 273 = 318 \text{ K}$ $\Delta T = T_i - T_f = 20 \text{ K}$~~

~~$n = \frac{m}{M} = \frac{50 \text{ g}}{27 \text{ g mol}^{-1}} = 1.85 \text{ mol}$~~

~~$Q_m = q \times \Delta T \times n$ wrong eq!~~

~~$1100 \text{ J} \times 20 \text{ K} \times 1.85 \text{ mol} = 40,740 \text{ J}$~~

Q_3