



Physical_Chemistry_2nd_YUGS_EV_ST



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Name of a student _____ Signature _____ No. 22

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)

Q2

$\Delta T = ?$

$V = 5L$

$P = 80 \text{ bar}$

$n = 5 \text{ mole}$

$PV = nRT$

$\Delta T = \frac{PV}{nR} = \frac{80 \times 5 \times 10^{-3}}{5 \times 0.0821} = 22.82$

الطلب الاول

Q2

$P = 0.0341$

$V = 0.0237$

$\Delta T = \frac{PV}{nR} = \frac{0.0341 \times 0.0237}{5 \times 0.0821} = 9 \times 10^{-2}$

الطلب الثاني

Q3

$q = 1100 \text{ J}$

$Wt = 50$

$M.Wt = 27$

$T_i = 25$

$T_f = 45$

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

$1100 = 1.85 n C_{p,m} \cdot 20$

$1100 = 37 C_{p,m}$

$C_{p,m} = \frac{1100}{37} = 29.72$

$n = \frac{Wt}{M.Wt} = \frac{50}{27} = 1.85$

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

الطلب الثالث