



Physical\_Chemistry\_2<sup>nd</sup>\_YUGS\_EV\_ST



Name of a student \_\_\_\_\_ Signature \_\_\_\_\_ No. \_\_\_\_\_

Mustansiriyah University  
Department of Chemistry

1<sup>st</sup> 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)  $ni/nT$
- (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  $\Delta H = zero$ , 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,  $27 \text{ g mol}^{-1}$ ) of aluminum metal. The temperature increased from  $25^{\circ}C$  to  $45^{\circ}C$ . Calculate  $C_{p,m}$  of aluminum.

(25 Marks)

Q2

$$\frac{T_1}{T_2} = \frac{V_1}{V_2}$$

~~$$PV = nRT$$~~

~~$$1 \times 5 = 5 \times 8.314 \times T$$~~

~~$$T = \frac{5}{41.57}$$~~

$$T = 0.12027 \text{ sec}$$

غازي

~~$$P_i = \frac{nRT}{V}$$~~

~~$$= \frac{50 \times 0.120}{V}$$~~

Q2  
25  
3

Q3

$$q = 1100 \text{ J}, w = 50 \text{ J}, n = 2 \text{ mol}^{-1}$$

~~$$T_2 = T_1 - 45^\circ\text{C} - 25^\circ\text{C} = 20^\circ\text{C}$$~~

$$T_1 = 25^\circ\text{C}, T_2 = 45^\circ\text{C}$$

$$C_m = -q$$

Q3  
2  
25