



1/5

F6

20/100 Twenty

Physical Chemistry 2nd YUGS EV ST-2025



11-12-2025
Signature
7 marks

Name of a student _____ Signature _____ No. 7

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)

ما نور بال
الوزن الجزيئي
الدرجة الحرارة
ازدادت
الطاقة الحرارية
مساحة حرارة مولارية
تبعوت الضغط
 T_1 T_2

$R = 0.082$
 $T = 2.2$

Q2)

①

~~PV = nRT~~ $\frac{b}{a}$

wrong eq!

$T = \frac{PV a}{nR b} = \frac{80 \times 5 \times 0.0341}{5 \times 0.082 \times 0.0237}$

$T = \frac{13.64}{0.009717} = 1400 \text{ K}$

$\frac{8}{25}$
? = units

T = 2.2.
n = 5 mol
V = 5 L
P = 80 atm
R = 0.082
a = 0.0341
b = 0.0237

②

~~$T = \frac{PV}{nR} = \frac{80 \times 5}{5 \times 0.082} = 975 \text{ K}$~~

Q3)

~~PV = nRT~~

~~$q = \frac{wt}{n \cdot wt} \times R \times T$~~

$\frac{2}{25}$
Q3

$S_m \cdot 1100 = \frac{50}{27} \times 0.082 \times 293$

$S_m = \frac{4.1 \times 293}{29700}$

$S_m = 0.54 \text{ J/K}$

~~4.1~~

$\Delta T = T_2 - T_1$

$\Delta T = 45 - 25 = 20$

$T = 20^\circ\text{C} + 273 = 293^\circ\text{C}$

~~$T = 293 \text{ K}$~~

$R = 0.082$

$\eta = \frac{wt}{n \cdot wt}$

~~$q = PV$~~