



Handwritten marks and scribbles in red ink at the top left.

F4

Physical Chemistry 2nd YUGS_EV_ST

Handwritten marks: 20/100 Twenty only



Name of a student _____ Signature _____ No. _____

Mustansiriyah University
Department of Chemistry

1st SEM-2025_Bologna_Process
Mid Exam Class A_Paper_B

Q1: Circle the right answer for all of the following

(50 Marks)

1: Liquefaction of the gas means which of the following?

- (a) $pV_m = nRT$
- (b) $pV_m < nRT$ (circled)
- (c) $pV_m > nRT$
- (d) $pV_m \neq nRT$

2: What is the right formula that can be used for calculating the mole fraction of the gas in a mixture?

- (a) V/n
- (b) n/V
- (c) V/m (circled)
- (d) n_i/n_T

3: A real gas behaves like an ideal gas, when which of the following is true?

- (a) $pV_m/RT = 1$
- (b) $pV_m/RT \neq 1$
- (c) $pV_m/RT < 1$ (circled)
- (d) $pV_m/RT > 1$

4: Heat energy transfer can be measured by which of the following?

- (a) thermometer (circled)
- (b) closed system
- (c) heat capacity
- (d) calorimeter

5: An isobaric process means which of the following?

- (a) $\Delta T = 0$
- (b) $\Delta p = 0$
- (c) $C_v \Delta T = 0$
- (d) $C_p \Delta T = 0$ (circled)

6: The unit of C_p/C_v is:

- (a) $J mol^{-1} K^{-1}$
- (b) $J g^{-1} K^{-1}$
- (c) $J mol^{-1} ^\circ C^{-1}$
- (d) none of these (circled)

7: When the process cannot compensate the loss of q, then we can call it:

- (a) isothermal
- (b) adiabatic
- (c) isobaric (circled)
- (d) isochoric

8: When the system is completely isolated, then ΔH can be calculated by which of the following?

- (a) $p_{ex} \Delta V$
- (b) $nRT \ln V_f/V_i$
- (c) $C_p \Delta T$ (circled)
- (d) ΔU

9: $C_p > C_v$ due to which of the following?

- (a) ΔU
- (b) Q
- (c) ΔH (circled)
- (d) R

10: When the process is reversible and $p_{in} > p_{ex}$, the process is called:

- (a) isochoric
- (b) isothermal (circled)
- (c) isobaric
- (d) exothermic

Q2: Calculate the density of an unknown gas with a molar mass of $40 g mol^{-1}$ at STP conditions. (25 points)

$n = 2 mol$ T_f

Q3: A diatomic ideal gas is compressed reversibly and adiabatically at T_i of $67^\circ C$ to T_f of $450 K$. Calculate

(a) work was performed? (b) ΔU , (c) q and (d) ΔH . (25 Marks)

$T_i = 67 + 273 = 340 K$

Handwritten calculations at the bottom right: $\frac{273}{340}$

~~238 273 298 K~~

Q2

~~$W_{irr} = nRT$ wrong eq!~~

~~$40 = n \times 0.0082 \times 298$~~

~~$n = \frac{40}{2384} = 0.0082$~~

Zero
25

298
82

500
2384

40

Q3

~~$W = nRT \Delta T$ wrong eq!~~

~~$W = 2 \times 0.0082 \times 1100$~~

~~$W = 2 \times 902$~~

~~$W = 1804 \text{ J}$~~

Zero
25

$\Delta T = T_f - T_i$

$= 430 - 340 = 110 \text{ K}$

82
110

182
902

$\Delta U = q + w$

~~W = \Delta U~~