



1.25 / 5

F5

20 / 100

Twenty only

Physical Chemistry 2<sup>nd</sup> YUGS EV ST



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Mustansiriyah University  
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1<sup>st</sup> SEM-2025 Bologna Process  
Mid Exam Class A Paper B

Q1: Circle the right answer for all of the following

(50 Marks)

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

- (a)  $pV_m = nRT$       (b)  $pV_m < nRT$       (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)  $V/m$       (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)  $pV_m/RT < 1$       (d)  $pV_m/RT > 1$

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

- (a) thermometer      (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)  $C_p \Delta T = 0$

6: The unit of  $C_p/C_v$  is:

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

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

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

8: When the system is completely isolated, then  $\Delta H$  can be calculated by which of the following?

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

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

- (a)  $\Delta U$       (b) Q      (c)  $\Delta H$       (d) R

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

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

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

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

- (a) work was performed? (b)  $\Delta U$ , (c) q and (d)  $\Delta H$ .

(25 Marks)

1 atm  
 $T_f = 25^\circ C$   
 $+ 273$   
 $= 298$

$Q_2 = \frac{200}{25}$

NO ANSWER, why?

Q3

~~$\Delta T = T_f - T_i$~~   
 ~~$= 450 - 340$~~   
 ~~$= 110 K$~~

~~$w = R \Delta T$~~

~~$w = 0.0089 (110)$~~   
 ~~$w = 0.982$~~

$Q_3 = \frac{5}{25}$

~~$\Delta U = w - \Delta T$~~   
 ~~$= -1.09 - 0.98$~~

~~$T_i = 273 + 273$~~   
 ~~$= 340 K$~~   
 $T_f = 450 K$   
 $w = ?$   
 $\Delta U = ?$   
 $\Delta H = ?$