



2/5

F25

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

40/100 Forty only  
11/12-2025  
Abduljabbar



Name of a student حسين جعفر محمد Signature Abduljabbar No. 9

Mustansiriyah University  
Department of Chemistry

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: Liquefaction 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)  $J mol^{-1} K^{-1}$  (b)  $J g^{-1} K^{-1}$  (c)  $J mol^{-1} ^\circ C^{-1}$  (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  $40 g mol^{-1}$  at STP conditions. (25 points)

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)  $\Delta U$ , (c) q and (d)  $\Delta H$ .

(25 Marks)

Q2/ أحساب الكثافة

M = molar mass 40 g/mol

$$d = \frac{PM}{RT}$$

STP = الظروف القياسية للغازات

$$d = \frac{1 \times 40}{0.082 \times 373}$$

? = units

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$$R = 0.082$$

$$T = 0 + 273$$

$$T = 373 \text{ K}$$

$$P = 1 \text{ atm}$$

$$d = \frac{40}{30.586}$$

$$d = 1.3077$$

القانون العام للغازات  $PV = nRT$

Q3/

$$T = 67^\circ\text{C} + 273$$

غازات مثالية

$$T_i = 340 \text{ K}$$

العلاقة بين  $\Delta U = q + w$

$$T_f = 450 \text{ K}$$

$$\Delta T = T_f - T_i$$

$$2 = 110 + w$$

$$\Delta T = 450 - 340$$

$$w = \frac{110}{2}$$

$$\Delta T = 110 \text{ K}$$

$$w = 55$$

$$\Delta U = 2$$

$$\Delta H = \Delta U + q$$

$$\Delta H = \Delta U + 110$$

$$\Delta H = 2 + 110$$

$$\Delta H = 112$$

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