Physical_Chemistry_2nd_YUGS_EV_ST

Name of a student ---------- Signature ---------- No. ----------

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1st 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) $J\ mol^{-1}K^{-1}$ (b) $J\ g^{-1}K^{-1}$ (c) $J\ mol^{-1}\ ^oC^{-1}$ (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 ΔH can be calculated by which of the following?
(a) $p_{ex}\Delta V$ (b) $nRTLnV_f/V_i$ (c) $C_p\Delta T$ (d) ΔVU

9: $C_p > C_V$ due to which of the following?
(a) ΔU (b) Q (c) ΔH (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 °C to T_f of 450 K. Calculate (a) work was performed? (b) ΔU, (c) q and (d) ΔH. (25 Marks)

$^oC\ 67 + 273 = 340\ K$

Thu_11/12/2025 Best wishes Dr Abduljabbar I. R. Rushdi

Q2/

Zero

$Q_2 = 2$

NO ANSWER, Why?

Q3/ $Q_3 = \frac{5}{2}$

a-) $w = -nRT\ln\frac{V_f}{V_i} \Rightarrow w = -2 * 8.314 \ln\frac{45}{34}$ Wrong eq.

$w = -16.6 \ln\frac{45}{34} \Rightarrow w = -16.6 * 0.2 \Rightarrow w = -3.32\ J$

b) $\Delta U = 0$ Adiabatic System?

c) $q = w + \Delta T \Rightarrow q = -3.32 + 790 \Rightarrow q = 786.68\ J$

d) $\Delta H = q + w \Rightarrow 786.68 + (-3.32) \Rightarrow \Delta H = 783.36\ kJ/mol$

$q = 0$