Physical Chemistry_Chpt_One_Properties of Gases

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

University of Mustansiriyah — **1st Semester-2021**

Department of Chemistry — **1st Exam-Repeat_1**

Q1: Circle the right answer for all of the following: **(50 points)**

1: Calculate the weight of C_2H_4 gas (26 g mol^{-1}) in a 10000 Cm^3 cylinder at 1520 mmHg and 90 ^oC.

Answer: **a) 17.47 g^{-1} mol^{-1}** b) 17.47 g^{-1} c) 17.47 mol d) 17.47 g e) 17.47 mg

2: When $V_{Real} > V_{Perfect}$, this means that the gas is:

Answer: a) perfect **b) noble** c) real d) heavy

3: The difference between real and ideal gas equation, that the ideal gas equation is not interested in?

Answer: a) p_{gas} & n_{gas} b) $V_{container}$ & $p_{attraction}$ **c) V_{gas} & $p_{attraction}$** d) T_{gas} & p_{gas}

4: Calculate the density of C_2H_4 is placed in a 50000 Cm^3 container at 760 torr and 273 K.

Answer: a) 1.16 g^{-1} L^{-1} **b) 1.16 g^{-1} L** c) 1.16 g L^{-1} d) 1.16 mg L^{-1}

5: Graham's law studies the ---------- of the gas.

Answer: a) flow b) collision **c) diffusion** d) effusion

6: The right formula of the Dalton's law is?

Answer: a) $p_i = \chi_i \sum p_i$ **b) $p_i = \chi_i \sum p_T$** c) $p_T = \chi_i \sum p_i$ d) $p_i = \chi_T p_T$

7: The law of Corresponding states is an evidence that the gas is?

Answer: **a) real** b) ideal c) expanded d) compressed e) heavy

8: The total mol fractions of atmospheric pressure of air is equal to?

Answer: a) zero **b) one** c) two d) three

9: A gas occupies 30×10^{-3} m^3 at 75 ^oC and 76 CmHg pressure. What would be its volume at STP?

Answer: a) 23.5 dm^3 b) 23.5 m^2 **c) 23.5 L^{-1}** d) 23.5 m^{-3}

10: When the value of Z > 1 this means the dominated forces are:

Answer: a) attraction b) van der Waal **c) repulsion** d) compression

Q2: The following data have been observed for 5000 mg of unknown gas at 0 ^oC. Calculate the best value of the molar mass of this gas, and what is it? **(25 points)**

p/10^5 Pa	0.75	0.60	0.25
V/dm^3	9.33	11.60	27.50

Q3: A perfect gas undergoes isothermal compression, which reduces its volume by 1.80 dm^3. The p_f and V_f of the gas are 197 atm and 2.14 dm^3, respectively. Calculate the $p_{original}$ of the gas in (a) bar, (b) torr. (25 points)

Sun_28/11/2021 **With best my wishes** **Dr Abduljabbar I. R. Rushdi**

Q2-1

$PV = nRT$

$T(k) = t°C + 273 = 273\ k$

$R = 0.082\ atm \cdot L / K \cdot mol$

$n = \frac{RT}{PV}$

$n_1 = \frac{0.082 \times 273}{0.75 \times 9.33} = 23.5$

$n_2 = \frac{0.082 \times 273}{0.60 \times 11.60}$

$n_3 = \frac{0.082 \times 273}{0.25 \times 27.50} =$

Q3-1

$P_1V_1 = P_2V_2$

$1.80 \times 1.67 = 2.14$

$= \frac{2.14}{1.80 \times 1.67} = 2.3\ L$