Physical Chemistry_Chpt_One_Properties of Gases

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1st Semester-2021

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^3 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

p.1.7

Q2/ $PV = nRT \Rightarrow PV = \frac{wt}{M} RT$

$9475 \times 10^{3}\ atm \times 933 \times 10^{3}\ L = \frac{5000\ mg}{M} \times 0.082 \frac{atm.L}{mole.k} \times 273\ K$

$M = 78.14\ g/mole$

$6081\ atm \times 1160\ L = \frac{5000\ mg}{M} \times 0.082 \frac{atm.L}{mole.k} \times 273\ K$

$M = 91.25\ g/mole$

$27450\ atm \times 250\ L = \frac{5000\ mg}{M} \times 0.082 \frac{atm.L}{mole.k} \times 273\ K$

$M = 10.21\ gm/mole$

Q2 15/25

ideal gass

Q3/ $P_1 V_1 = P_2 V_2$

$1.97\ atm \times 1.80\ dm^3 = P_2 \times 2.14\ dm^3$

$P_2 = \frac{1.80 \times 1.97}{2.14} = 5.712\ atm$

Q3 5/25

1 atm ≈ 1 bar

a) $5.712\ atm \times 1.01350\ bar = 2874.52\ bar$

b) $5.712\ atm \times 760\ torr = 475.31\ torr$