(FRI)

Physical Chemistry_Chpt_One_Properties of Gases

Name of a student ___Qamar alsade imad___ Signature _____ No. __11__

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 $30 \times 10^{-3}\ m^3$ 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

$$\frac{P_1}{P_2} = \frac{V_2}{V_1}$$

$$\frac{0.75}{P_2} = \frac{5000}{9.33}$$

(Q2 circled)

$$P_2 = \frac{6.9975}{5000} \implies \boxed{P_2 = 0.0013995 \, Pa}$$

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$$\frac{P_1}{P_2} = \frac{V_1}{V_2}$$

$$\frac{0.60}{P_2} = \frac{5000}{11.60}$$

$$P_2 = \frac{6.96}{5000} \implies \boxed{P_2 = 0.001392 \, Pa}$$

$$\frac{P_1}{P_2} = \frac{V_1}{V_2}$$

$$\frac{0.25}{P_2} = \frac{5000}{27.50}$$

$$P_2 = \frac{6.875}{5000} \implies \boxed{P_2 = 0.001375 \, Pa}$$

Q3

$$\frac{P_1}{P_2} = \frac{V_2}{V_1}$$

$$\frac{P_1}{197} = \frac{1.80}{1.14}$$

(Q3 circled)

$$P_1 = \frac{354.6}{1.14} = \boxed{311.0526316 \, pa}$$