F32

Physical Chemistry_Chpt_One_Properties of Gases

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

Department of Chemistry — **1st Exam-paper F**

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

1: According to van der Waal's corrections if $V_{Real} < V_{Perfect}$ of any gas that means the gas has:

Answer: a) non-polar particles b) polar particles **c) small particles** d) big particles

2: Calculate the weight of CO_2 gas (44 g mol^{-1}) in a 0.5×10^4 mL cylinder at 20×10^2 kPa and 25 °C.

Answer: a) 180 g mol^{-1} **b) 180 g** c) 180 mol d) 180 kg

3: Calculate the density of CO_2 placed in a 22.4×10^3 mL cylinder at 20×10^2 kPa and 298 K.

Answer: a) 36.06 kg L^{-1} **b) 36.06 g L^{-1}** c) 36.06 g d) 36.06 L^{-1}

4: According to Graham's law the heaviest gas has?

Answer: a) low rate b) high rate c) middle rate **d) low density**

5: A gas occupies 20 dm^3 at 90 °C and 760 torr pressure. What would be its volume at STP?

Answer: a) 15.04 mL b) 15.04 dm^3 **c) 15.04 L^{-1}** d) 15.04 dm^{-3}

6: A vessel contains a certain amount of gas at 80×10^5 Pa. The gas is transferred to another tank 20 dm^3 with pressure of 20×10^5 Pa. What should be its volume?

Answer: **a) 0.5 L** b) 0.5 Pa L c) 0.5 Pa dm^3 d) 0.5 L^{-1}

7: According to Avogadro's law n is directly proportional with volume at constant?

Answer: a) p & V **b) T & p** c) T & V d) p & n e) R & P

8: Attractive and repulsive forces between particles are present in a?

Answer: **a) perfect gas** b) non-ideal gas c) ideal gas d) noble gas

9: It can follow the direct proportional between temperature and volume through the law of

Answer: a) Van der Waal b) Graham **c) Charles** d) Gay-Lussac

10: The mol fraction of atmospheric pressure is equal to?

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

Q2: The following data have been observed for 10000 mg of CO_2 gas at 273 K. Calculate the best value of the molar mass of CO_2. **(25 points)**

$p/10^2$ kPa	1.00	2.00	3.00
V/L	4.00	7.50	11.75

Q3: A perfect gas undergoes isothermal expansion, which increases its volume by 2.48 dm^3. The p_i and V_i of the gas are 2×10^2 kPa and 2.14 dm^3, respectively. Calculate the p_f of the gas in (i) bar, (ii) torr. (25 points)

Thur_11/11/2021 Best wishes Dr Abduljabbar I. R. Rushdi

Q2

$m = 1000\,mg \rightarrow m = 10\,g$

$T = 273\,K$

$\rightarrow n = \frac{m}{M} = \frac{10?}{39?} = 0.25?$ From Where this value

$M = \frac{RTn}{PV}$

$\rightarrow M = \frac{0.082(273)(0.25)}{(1.00)(4.00)}$

$M = \frac{5.596}{4}$

$M = 1.399\ mol/g$

$M = \frac{RT}{PV}\,m \quad \frac{(0.082)(273)(0.25)}{(2.00)(7.50)}$

$M = \frac{5.596}{15} \rightarrow M = 0.37\ mol/g$ g/mol

10/25

$M = \frac{RTn}{PV}$

$M = \frac{5.596}{(3.00)(11.75)} = \frac{5.596}{35.25} \rightarrow M = 0.158\ mol$

Q3

$P_i = 2 * 10^2\ KPa \rightarrow P_i = \frac{2 * 10^2}{10^3} \rightarrow P_i = 2 * 10^{-1}\ Pa$

$V_i = 2.14\ dm^3$

$P = 2.48\ dm^3$

$\rightarrow V_i = \frac{2.14}{1000} \rightarrow V = 0.0214\ L$

Q3 0/25