F6

Physical Chemistry_Chpt_One_Properties of Gases

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

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

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

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 x 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 × 10^4 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)

Wed_10/11/2021 Best wishes Dr Abduljabbar I. R. Rushdi

Q2/

1- P-1.00 , V-4.00

$PV = nRT$

$(1.00 \times 4.00) = \frac{m}{M}(0.082 \times 273)$

$(1.00 \times 4.00) = \frac{10000}{M}(0.082 \times 273)$

$4 = \frac{1 \times 10^{-4}}{M}(22.386)$

$M = \frac{22.386 \times 10^{-4}}{4} = 55.9$

2- P-(2.00) V-(7.50)

$PV = nRT$

$(2.00 \times 7.50) = \frac{10000}{M}(0.082 \times 273)$

$15 = \frac{1 \times 10^{-4}}{M}(22.386)$

$M = \frac{22.386 \times 10^{-4}}{15} = 0.148$

Q2 10/25

3- P(3) , V (11-75)

$PV = nRT$

$(3 \times 11.75) = \frac{10000}{M}(22.386)$

$35.25 = \frac{1 \times 10^{-4}}{M}(22.386)$

$M = \frac{22.386 \times 10^{-4}}{35.25} = 0.0632$

$P_1V_1 = P_2V_2$

$(2 \times 10^2 KPa)(2.14\ dm^3) = P_2(2.48\ dm^3)$

$P_2 = \frac{(2 \times 10 KPa)(2.14\ dm^3)}{(2.48\ dm^3)} =$

Q3 10/25