Karar Ameer mohmmed   A1

F13

Physical Chemistry_Chpt_One_Properties of Gases

Name of a student ----- Mawhuj J ----- Signature ------------------- No. ----6----

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 20×10^2 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 20×10^3 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   NO ANSWER

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.

p/10² kPa	1.00	2.00	3.00
V/L	4.00	7.50	11.75

(25 points)

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-
$$PV = \frac{m}{M} \times RT$$

$$1 \times u = \frac{10 \, g}{M} \times 0.08u \times 273$$

$$u = \frac{10}{M} \times 22,732$$

$$u = \frac{227,32}{M} \implies M = 56,83 \ mol \times g^{-1}$$

2-
$$PV = \frac{m}{M} \times RT$$

$$2 \times 7.5 = \frac{10}{M} \times 0.08u \times 273$$

$$15 = \frac{227,32}{M} \implies 15,15 = 18 \ mol \, g^{-1}$$

3-
$$PV = \frac{m}{M} \times RT$$

$$3 \times 11,75 =$$

$$35,25 = \frac{10}{M} \times 0.08u \times 273$$

$$35,25 = \frac{227,32}{M} \implies 5,57 \ mol \cdot g^{-1}$$

$$Q2 \ \frac{10}{25}$$

Q3

$$\frac{P_1}{P_2} = \frac{V_2}{V_1} \implies \frac{900}{P_2} \times \frac{2.14}{2.48}$$

$$P_2 = \frac{900 \times 2.48}{2.14} \implies 21.8 \ kPa$$

$$\implies 781 \ torr$$

$PF_5 \ ?$
$V_5 = 2.48$
$P_1 \ is \ 900$
$V_1 \ is \ 2.14$

$Q3 \ \frac{10}{25}$