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 20×10^5 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)

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

Q2

$$PV = nRT \qquad n = \frac{m}{M}$$

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

$$M_1 = \frac{P_1 V_1 m}{RT} = \frac{(1.00)(4.00)L(\times 0)g}{(0.082)\frac{mol \cdot l}{atm \cdot k}(823)k} \quad ?$$

$$=$$

$$M_2 = \frac{P_1 V_2 m}{RT} = \frac{(2.00)(2.50)L(10)g}{(0.082)\frac{mol \cdot l}{atm \cdot k}(923)k} \quad ?$$

$$=$$

$$M_3 = \frac{P_3 V_1 m}{RT} = \frac{(3.00)(11.25)L(10)g}{(0.082)\frac{mol \cdot l}{atm \cdot k}(923)k} \quad ?$$

$$=$$

Q_3 NO ANSWER

Why?