Name of a student __Alyaa Abdul Kareem__ Signature _____ No. ___⑤___

University of Mustansiriyah

Department of Chemistry

1st Semester-2021

1st Exam-paper E

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

1: If a gas has polar particles then the difference between the volume of this gas is:

Answer: a) $V_{Real} > V_{Perfect}$ b) $V_{Real} < V_{Perfect}$ c) $V_{Real} = V_{Perfect}$ d) $V_{Real} \neq V_{Perfect}$

2: A gas occupies 60×10^3 mL at 150 °C and 760 mmHg pressure. What would be its volume at STP?

Answer: a) 38.7 mL   b) 38.7 dm^3 c) 38.7 L^{-1} d) 38.7 dm^3

3: Calculate the weight of H_2O gas (18 g.mol^{-1}) in a 5 L cylinder at 10×10^2 kPa and 373 K.

Answer: a) 29.40 g mol^{-1} b) 29.40 g   c) 29.40 mol   d) 29.40 kg

4: Calculate the density of H_2O placed in a 22400 mL cylinder at 10^5 Pa and 0 °C.

Answer: a) 0.804 kg L^{-1} b) 0.804 g L^{-1} c) 0.804 g   d) 0.804 L^{-1}

NO ANSWER, why?

5: According to Graham's law the heaviest gas is?

Answer: a) H_2O b) CH_4 c) NH_3 d) Cl_2

6: A tank contains a certain amount of gas at 10^5 Pa. The gas is transferred to another tank 40 dm^3 with pressure of 200×10^3 Pa. What should be its volume?

Answer: a) 80 L   b) 80 Pa L   c) 80 Pa dm^3 d) 80 L^{-1}

7: According to Boyle's law the pressure of a gas is inversly proportional with?

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

8: The difference between real and ideal gas, that the real gas interested in?

Answer: a) V & p   b) V & T   c) p & n   d) T & p

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

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

10: The behaviour of real gas is ideal when the value of Z is equal to

Answer: a) $V_m < V^0_m$ b) $V_m > V^0_m$ c) $V_m = V^0_m$ d) $V_m \neq V^0_m$

Q2: The following data have been observed for 800 mg of nitrogen gas at 273 K. Calculate the best value of the molar mass of N_2. (25 points)

p/10^5 Pa	0.750	0.500	0.200
V/dm^3	3.0	4.5	7.0

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 2×10^2 kPa and 2.14 dm^3, respectively. Calculate the $p_{original}$ of the gas in (i) bar, (ii) torr. (25 points)

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

Q2/

Solu:-

$$\frac{1\,atm}{0.750\times10^5\,Pa} = 1.3\times10^{-5}$$

(Arabic note, red): خطأ لعدم استعمال $dm^3 \equiv L$ ... atm

(Arabic note, red): $10^5\,Pa = 1\,atm$ ... الخطأ لعدم استعمال mbar ... $3.0\times1000 = 3\times10^{+3}$

$$PV = nRT \implies 1.3\times10^{-5} * 3\times10^{+3}\,? = n\,(0.082\,? * 298\,?)$$

(red) الوحدة = ؟

$$n = 2.3$$

$$n = \frac{m}{M} \implies 2.3 = \frac{0.8}{M} \implies M = 0.9 \quad (\text{g/m})$$

$$\frac{1\,atm}{0.500\,Pa} = 2.0$$

$$PV = nRT \implies 2.0 * 4.5\times10^3 = n\,(0.082 * 298)\quad 4.5\times1000 =$$

$$n = 4.6$$

$$n = \frac{m}{M} \implies 4.6 = \frac{8}{M} \implies M = 3.0 \text{ mole}$$

$$PV = nRT \implies \therefore M = 4.3 \qquad Q_2 \frac{10}{25}$$

Q3/

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

$$Q_3 \frac{5}{25}$$