F35

Physical Chemistry_Chpt_One_Properties of Gases

Name of a student Ali Sabbar Faris Signature ---------- No. 7

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

Department of Chemistry **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}**

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) $V_m < V^O_m$ b) $V_m > V^O_m$ c) $V_m = V^O_m$ d) $V_m \neq V^O_m$

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/ $PV = nRT$ $\quad R = \frac{atm \times L}{mol \times K}$

$T = K$, $V = L$, $P = atm$

1) $n = \frac{PV}{RT}$ 0.75 ? ≡ units

$n = \frac{7.40 \times 3.0}{0.082 \times 273}$? ? $= 73.90$ mol

$n = \frac{m}{M} \Rightarrow M = nxM = 73.90 \times 800$

$= 59.1$ g x mol

2) $n = \frac{PV}{RT} = \frac{4.9 \times 4.5}{0.082 \times 273}$? ? $= \frac{22.05}{22.38}$? $= 0.9$ mol

$n = \frac{m}{M} \Rightarrow m = nxm \Rightarrow M =$ 720 g x mol

3) $PV = nRT \Rightarrow n = \frac{PV}{RT}$

$= \frac{1.9 \times 7.0}{0.082 \times 273} = \frac{13.3}{22.38}$

$= 0.59$ g x mol

Q2 10/25

Q3 0/25 NO ANSWER why?