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65/100 Sixty five

Physical Chemistry_Chpt_One_Properties of Gases

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

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

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)

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

Q2 $m = \frac{800}{1000} = 0.8g$ $T = 273$

$PV = nRT$

$n = \frac{PV}{RT}$

$= \frac{0.500 Pa \times 3.0 dm^3}{0.082 \times 273 K}$

$= 0.1$?

$n = \frac{m}{n.wt} \Rightarrow n.wt = \frac{m}{n}$

$n.wt = \frac{0.8g}{0.1} = 8g/mol$

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? = units

$= \frac{0.500 Pa \times 4.5 dm^3}{0.082 \times 273 K}$

$= 0.1$?

$n.wt = \frac{0.8}{0.1} = 8g/mol$

$= \frac{0.200 Pa \times 7.0 dm^3}{0.082 \times 273 K}$

$0.063 g/mol$

Q3 $V_1 = 1.8 dm^3$ $V_2 = 2.1 dm^3$ $P_1 = ?$ $P_2 = 200 kPa$

$P_1 V_1 = P_2 V_2$

$P_1 = \frac{2 \times 10^5 Pa \times 2.1 \times dm^3}{1.8 dm^3}$

$200 \times 1000 = 2 \times 10^5 Pa$

$10^5 Pa = 1 at$

$2 > 7$ bar

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$\frac{23}{260} = 2.8\%$ Vol