



F10

Physical Chemistry_Chpt_One_Properties of Gases



Name of a student

Signature

No. 12

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 $10 \times 10^2 \text{ kPa}$ 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 $200 \times 10^3 \text{ Pa}$. 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 inversely 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) $V_m < V_m^0$ b) $V_m > V_m^0$ c) $V_m = V_m^0$ d) $V_m \neq V_m^0$

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 .

$p/10^5 \text{ Pa}$	0.750	0.500	0.200
V/dm^3	3.0	4.5	7.0

(25 points)

Q3: A perfect gas undergoes isothermal compression, which reduces its volume by 1.80 dm^3 . The p_i and V_i of the gas are $2 \times 10^2 \text{ kPa}$ 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

30/100 Thirtly only

25-11-21

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Q1 10/50

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مميز

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

$$M = \frac{mRT}{PV}$$

$$M = \frac{83 \times 0.082 \frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}} \times 273 \text{K}}{0.07 \text{ atm} \times 3 \times 10^{-3} \text{ L}}$$

$$M = 7.6 \text{ g/mol}$$

$$M = \frac{83 \times 0.082 \frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}} \times 273 \text{K}}{0.004 \text{ atm} \times 4.5 \times 10^{-3} \text{ L}}$$

$$M = 11.1 \text{ g/mol}$$

$$M = \frac{83 \times 0.082 \frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}} \times 273 \text{K}}{0.019 \text{ atm} \times 7 \times 10^{-3} \text{ L}}$$

$$M = 13.7 \text{ g/mol}$$

$$m = 800 \text{ g} \\ = 800 \times 10^{-3} \text{ g} \\ = 8 \text{ g}$$

$$P = \frac{0.75}{101.3}$$

$$P = 0.07 \text{ atm}$$

$$V = 3 \times 10^{-3}$$

$$P = \frac{0.5}{101.3}$$

$$P = 0.004 \text{ atm}$$

$$V = 4.5 \times 10^{-3}$$

$$P = \frac{0.2}{101.3}$$

$$P = 0.197$$

$$V = 7 \times 10^{-3}$$

Q25

Q7

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

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

$$P = \frac{1.8 \text{ dm}^3 \times 2 \times 10^3 \text{ kPa}}{2.14 \text{ dm}^3}$$

$$P = 168 \text{ kPa}$$

$$P = 168 \times 10^3 \text{ Pa}$$

$$P = \frac{168000}{101.3} = 166 \text{ atm}$$

$$1 \text{ atm} = 1.013 \text{ bar}$$

$$P = 166 \text{ bar}$$

$$P = \frac{166}{760}?$$

$$= 0.22 \text{ Torr}$$

Q3

Q25