



F15

Physical Chemistry_Chpt_One_Properties of Gases

300 Thirty only
100

25-11-21

Dr. Abduljabbar I. R. Rushdi

Name of a student Areeg Vasil Yousif Signature _____ No. 10

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 dm³ c) 38.7 L¹ d) 38.7 dm³

3: Calculate the weight of H₂O 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 H₂O 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) H₂O b) CH₄ c) NH₃ d) Cl₂

6: A tank contains a certain amount of gas at 10^5 Pa. The gas is transferred to another tank 40 dm³ with pressure of 200×10^3 Pa. What should be its volume?

Answer: a) 80 L b) 80 Pa L c) 80 Pa dm³ 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 N₂.

$p/10^5$ 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 dm³. The p_f and V_f of the gas are 2×10^2 kPa and 2.14 dm³, 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/

$PV = nRT$

$10^{+5} \times 3.0 = n \times 0.082 \times 273$

$n = \frac{10^{+5} \times 3.0}{0.082 \times 273} = ?$

$n = \frac{m}{M}$

2) $PV = nRT$

$0.500 \times 4.5 = n \times 0.082 \times 273$

$n = \frac{0.500 \times 4.5}{0.082 \times 273} = ?$

$n = \frac{m}{M} = ?$

According to units of R (atm) $\times 10^5$ Pa should be converted to atm

Q2 25

3) $PV = nRT$

$0.200 \times 7.0 = n \times 0.082 \times 273$

$n = \frac{0.200 \times 7.0}{0.082 \times 273} = ?$

$n = \frac{m}{M} = ?$

Q3/ $V_T = V_2 \ominus V_1 +$

$180 = 2.14 \ominus V_1 +$

$V_1 = 2.14 - 180$

$V_1 = 0.34 \text{ dm}^3$ Is this value acceptable

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

$\frac{P_1}{0.34} = \frac{2 \times 10^{+5}}{2.14}$

$P_1 = \frac{0.34 \times 2 \times 10^{+5}}{2.14} = P_1 = 0.8 \text{ Pa}$

Q3 25