



F30

Physical Chemistry_Chpt_One_Properties of Gases

35/100 Thirty five

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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 L⁻¹ d) 38.7 dm⁻³

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. (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 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

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Q2 $n = 800 \text{ mg}$ $T = 273$

1 $\Rightarrow PV = \frac{wt}{M} RT \Rightarrow (0.750)(3.0) = \frac{wt}{800} (0.082)(273)$

~~$\Rightarrow wt = 0.0924$~~

2 $\Rightarrow PV = \frac{wt}{M} RT \rightarrow 0.500(4.5) = \frac{wt}{800} (0.082)(273)$

$wt = 7.95$

3 $PV = \frac{wt}{M} RT \Rightarrow (0.200)(7.0) = \frac{wt}{800} (0.082)(273)$

$wt = 7.82$

Q3 $V = 1.80 \text{ m}$ $P_F = 2 \times 10^2 \text{ kPa} \Rightarrow \frac{2 \times 10^2}{10^5} 2 \times 10^8$

$V_F = 2.14$

$V_F = V_{\text{air}} - V \Rightarrow 2.14 = 1.80 + V \Rightarrow V = 0.34$

$P_F = \frac{V}{P} \Rightarrow 2 \times 10^3 = \frac{V - 2.14}{P_0}$

$P_0 = 2.48 \times 10^3 \text{ Pa}$

$\frac{\text{Pa } 2.48 \times 10^3}{10^5} = 2.48 \times 10^{-2} \text{ atm}$

Q3 $\frac{5}{25}$