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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 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 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 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/dm³	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   Dr Abduljabbar I. R. Rushdi

$Q2/$ $PM = \frac{m}{v} RT$

0.75 7.4? $* M = 266$? $* 0.082 * 273$? $\equiv$ units

$M = \dfrac{266 * 0.082 * 273?}{7.4} = \dfrac{5.95}{7.4}$

$M = 0.804$ g.Mol

$M = \dfrac{1.77 * 0.082 * 273?}{4.93} = \dfrac{3.96}{4.93}$ $Q_2 \frac{10}{25}$

$M = 0.803$ g.Mol

$M = \dfrac{114 * 0.082 * 273?}{1.97} = \dfrac{2.55}{1.97}$

$M = 1.29$ g.Mol

$Q3/$

$\dfrac{P_1}{P_2} = \dfrac{V_2}{V_1}$ $Q_3 \frac{5}{25}$

$\dfrac{P_1}{1.97} = \dfrac{1.8}{2.14}$

$P_1 = 0.42$ atm

1 atm $= 1$ bar
$0.42 = 0.42$

1 atm $= 760$ torr
$= 319$ torr