Name of a student ——————— Signature ——————— No.

University of Mustansiriyah   1ʳ 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 60×10^2 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) 1.804 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) $V_m < V^0_m$ b) $V_m > V^0_m$ c) $V_m = V^0_m$ d) $V_m \neq V^0_m$

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/10⁵ 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)

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

Q2/ شرح حول عالم الغاز؛ اللغاز الحق

① $PV = nRT \Rightarrow PV = \dfrac{m}{M.wt} RT \Rightarrow 0.75 \overset{?}{\times} 3 = \dfrac{(800)(0.082)(2738)}{M.wt}$

$units = ? \quad ? \quad ?$

$2.25 = \dfrac{17908.8}{M.wt}$ 7.9

$M.wt = \dfrac{17908.8}{2.25} = 7995$

② $PV = nRT \Rightarrow 0.500 \times 4.5$

$2.25 = \dfrac{17908.8}{2.25} = 799 \, g.mol^{-1}$ 7.9

③ $PV = nRT \Rightarrow 0.200 \times 7.0 = \dfrac{800}{M.wt}$ (Q2 15/20)

1-4

Q3/

$P_1 = \dfrac{P_2 V_2}{V_1} \Rightarrow P_1 = \dfrac{2 \times 10 \times 2.14}{1.80}?$ (Q3 5/20)