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35/100 Thirty five

Physical Chemistry_Chpt_One_Properties of Gases

Sajja Saad Mohammad H.

Name of a student ---------- Signature ---------- No. 6

University of Mustansiriyah — **1st 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) $V_{Real} \neq V_{Perfect}$ 0/5

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} 0/5

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** 0/5

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} 0/5

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5: According to Graham's law the heaviest gas is?

Answer: a) H_2O **b) CH_4** c) NH_3 d) Cl_2 0/5

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 200×10^3 Pa. What should be its volume?

Answer: a) 80 L b) 80 Pa L **c) 80 Pa dm^3** d) 80 L^{-1} 0/5

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 5/5

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 5/5

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** 5/5

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) $V_m \neq V^o_m$ 0/5

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/dm^3	3.0	4.5	7.0

Q3: A perfect gas undergoes isothermal compression, which reduces its volume by 1.80 dm^3. The p_f and V_f of the gas are 2×10^2 kPa and 2.14 dm^3, 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

Q1:- dry weight = 800 mg

(2) T = 273 K كلفن

(3) mass = ?

n = و / ع.و   M / M.wt

PV = nRT

	V	P
1.	3.0	0.750
2-	4.5	0.500
3-	7.0	0.200

R = 0.084

R_2 = units

(1) 0.750 ? * 3.0 ? = n * 0.084 * 273 ?

$n = \frac{0.750 * 3.0}{0.084 * 273}$ ⇒ n = 0.09 → ?

Q_2 10/25

(2) $\frac{0.500 * 4.5}{0.084 * 273}$ = n ⇒ n = 0.0982 → ?

2.25

(3) $\frac{0.200 * 7.0}{0.084 * 273}$ = n ⇒ n = → ?

Q2:- V_1 = 1.80 dm^3 / V_2 = 2.14 dm^3

p2 = 2×10^2 / p1 = ?

atm = 760 torr

atm = 1 pa

Q_3 10/25

$\frac{2 \times 10^2 \text{ kpa}}{1000}$

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

1.80 ? × p1 = 2.14 × $\frac{2.10^2}{1000}$?

$P_1 = \frac{2.14 \times \frac{2.10^2}{1000}}{1.80}$ = ?