



P7

Physical Chemistry Chpt_One_Properties of Gases

50 Fifty only

24-11-21
Abduljabbar I. R. Rushdi

هاجر سلمان قاسم

Name of a student hagir salman kasim Signature _____ No. 2

University of Mustansiriyah

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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 60×10^3 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 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 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}

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 N ₂	p/10 ⁵ Pa	0.750	0.500	0.200	(25 points)
	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_1 and V_1 of the gas are $2 \times 10^2 \text{ kPa}$ 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

Handwritten notes in Arabic: "حاز صباي يفتخر لعمري فقط", "علم فقط صفت فقط", "Je"

Handwritten notes: "No ANSWER", "35", "50", "Q1"

Handwritten note: "غاز ثقيل"

Handwritten note: "الفقعة انقله ونغير لفة حالة تاسيخه فقط"

Handwritten note: "تنا سبب تكبير"

Handwritten note: "فرق بين المثالي و حقيقي الغاز الحقيقي يكون مثالي"

Handwritten note: "يمكن متابعه العلاقة الطردية بين فقط ودرجة الحرارة"

Handwritten note: "يصبح السلوك الغاز الحقيقي قريب من المثالي"

Handwritten note: "وزن"

Handwritten note: "N2"

Handwritten note: "مادة وحدة"

Handwritten note: "نشان الذهب"

Handwritten note: "V2"

Handwritten note: "P1"

Handwritten note: "bar"

Q2 $PV = nRT$

$$PV = \frac{m}{M} RT$$

$$0.750 \text{ atm} \times 3.0 \text{ L} = \frac{0.8 \text{ g}}{M} \times 0.082 \frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}} \times 273 \text{ K}$$

$$= 79.5 \frac{\text{g}}{\text{mol}}$$

$$PV = \frac{m}{M} RT$$

$$0.500 \text{ atm} \times 4.5 \text{ L} = \frac{0.8 \text{ g}}{M} \times 0.082 \frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}} \times 273 \text{ K}$$

$$2.25 = \frac{7.95}{M}$$
$$= 79.5 \frac{\text{g}}{\text{mol}}$$

$$PV = \frac{m}{M} RT$$

$$0.200 \text{ atm} \times 7.0 \text{ L} = \frac{0.8 \text{ g}}{M} \times 0.082 \frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}} \times 273 \text{ K}$$

$$1.4 = \frac{0.8}{M}$$

is?

Q2 $\frac{15}{25}$

Q3 $\frac{0}{25}$

NO ANSWER Why?

- $M = 800 \text{ mg} = 100 \frac{0.8 \text{ g}}$
- $T = 273 \text{ K}$
- $P_1 = 0.750 \text{ atm}$
- $V_1 = 3.0 \text{ L}$
- $P_2 = 0.500 \text{ atm}$
- $V_2 = 4.5 \text{ L}$
- $P_3 = 0.200 \text{ atm}$
- $V_3 = 7.0 \text{ L}$

(77)