



Physical Chemistry_Chpt_One_Properties of Gases

35/100 Thirty five

F70

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1st Exam-paper A

Q1: Circle the right answer for all of the following:

(50 points)

1: If a gas has a non-polar particle then the difference between the volume of this gas is:

Answer: a) $V_{\text{Real}} > V_{\text{Perfect}}$ b) $V_{\text{Real}} < V_{\text{Perfect}}$ c) $V_{\text{Real}} = V_{\text{Perfect}}$ d) $V_{\text{Real}} \neq V_{\text{Perfect}}$

2: A gas occupies 300000 mL at 130 °C and 760 mmHg pressure. What would be its volume at STP?

Answer: a) 203.22 mL b) 203.22 dm³ c) 204 L d) 204 dm³

3: Calculate the weight of CH₄ (16 g.mol⁻¹) in a 10 L cylinder at 15 x 10⁵ Pa and 307 K.

Answer: a) 95.33 g mol⁻¹ b) 95.33 g c) 95.33 mol d) 95.33 kg

4: Calculate the number of moles for CH₄ in a 10000 mL cylinder at 10⁶ Pa and 32 °C.

Answer: a) 4.5 mol b) 4.0 mol c) 4.0 mmol d) 4.5 mmol

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

Answer: a) H₂O b) CH₄ c) NH₃ d) CO

6: A 20 L tank contains a certain amount of gas at 10⁵ Pa. The gas is transferred to another tank 40 dm³. What should be its pressure?

Answer: a) 0.50 atm b) 50 dm³ c) 50 atm d) 0.50 mmHg

7: According to the Avogadro's law the amount of a substance is directly proportional with?

Answer: a) p b) T c) R d) V e) n

8: The difference between real and ideal gas is one of the following?

Answer: a) law p & high T b) high p & law T c) high p & high T d) law p & law T

9: It can know the density of a gas by applying one of the following?

Answer: a) Van der Waal's law b) Graham's law c) Charles's law d) Gay-Lussac's law

10: If V_m is bigger than V_m^0 then this means the behaviour of a gas is?

Answer: a) Real b) Ideal c) Real & ideal d) $Z < 1$

Q2: A (28 mol) gas sample has a mass of 10000 mg. The volume of a container is 22 dm³ at a temperature of 76 °C and a pressure of 641 Torr. What is the density of the gas? (25 points)

Q3: An Ar gas is placed in a container at 30 °C at a pressure of 730 torr. What is the volume of the container in ml? (25 points)

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Best wishes

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$PV = nRT$

Q2

28 mol

$$V = 22 \text{ dm}^3 = 22 \times 10^{-2} \text{ L}$$

$$T = 70^\circ\text{C} + 273 = 343 \text{ K}$$

$$P = 64 \text{ Torr} \times 360 = 2304 \text{ atm}$$

$$d = \frac{mRT}{PV}$$

$$d = \frac{PM}{RT}$$

$$= \frac{0.0028 \times 0.082 \text{ atm}\cdot\text{K}/\text{mol}\cdot\text{L} \times 343 \text{ K}}{2304 \text{ atm} \times 22 \times 10^{-2} \text{ L}}$$

$$d = 0.567 \text{ g/L}$$

Q2 5/25

Q3

$$T = 30^\circ\text{C}$$

$$P = 730$$

$$V = 9$$

$$PV = nRT$$

$$V = \frac{nRT}{P}$$

Q3 15/25

$$T = 30^\circ\text{C} + 273 = 303$$

$$V = \frac{1 \text{ mol} \times 0.082 \text{ atm}\cdot\text{mol}^{-1}\cdot\text{K} \times 303 \text{ K}}{730 \text{ atm}}$$

$$= 0.033 \text{ L}$$

$$P = 730 \times 360 = 2628 \text{ atm}$$

$$V = 0.747 \text{ L}$$

$$V = 0.00747 \text{ mol}$$