



F11

35/100 Thirty Five
Also this is lab
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No. 12

Physical Chemistry_Chpt_One_Properties of Gases



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University of Mustansiriyah

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Department of Chemistry

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) $V_{Real} > V_{Perfect}$ b) $V_{Real} < V_{Perfect}$ c) $V_{Real} = V_{Perfect}$ d) $V_{Real} \neq V_{Perfect}$

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)

Q2/ $m = 28 \text{ g mol}^{-1}$ $V = 1000 \text{ mL}$ $P = 0.843 \text{ atm}$?

$T = 76 + 273 = 349 \text{ K}$

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

$= \frac{0.082 \text{ atm} \cdot \text{L} / \text{mol} \cdot \text{K} \times 349 \text{ K}}{0.843 \text{ atm} \times 0.028 \text{ mol}}$

$d = 0.95 \text{ g/L}$

Q2 $\frac{5}{25}$

$PV = nRT$

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

$PM = \frac{m}{V} RT$

$PM = dRT$

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

Q3// $T = 30 + 273 = 303 \text{ K}$

$p = \frac{730 \text{ torr}}{760 \text{ torr}} \Rightarrow 0.96 \text{ atm}$

$R = 0.082 \text{ atm} \cdot \text{L} / \text{mol} \cdot \text{K}$

$n = 1 \text{ mol}$

$PV = nRT \Rightarrow V = \frac{nRT}{P} = \frac{1 \text{ mol} \times 0.082 \text{ atm} \cdot \text{L} / \text{mol} \cdot \text{K} \times 303 \text{ K}}{0.96 \text{ atm}}$

$V = 25.88 \text{ L} \times 1000$

$V = 25880 \text{ mL}$

Q3 $\frac{25}{20}$

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