



Physical Chemistry-Properties of Gases

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Fourth only
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University of Mustansiriyah

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Department of Chemistry

1st Exam-paper B

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

1: Helium represents a.

Answer: ~~a) real gas~~ b) ideal gas c) noble gas d) heavy gas 25

2: A 0.2 L container contains a certain amount of gas at 1.0 bar pressure. The gas is transferred to another vessel of volume 0.5 dm³. What should be its pressure?

Answer: a) 0.60 atm b) 0.40 dm³ c) 0.4 atm d) 0.4 mmHg 25

3: A gas occupies 299 dm³ at 127 °C and 760 mm pressure. What would be its volume at STP?

Answer: a) 199.8 L b) 199 dm³ c) 200 L d) 204 dm³ 25

4: Calculate the weight of CH₄ (16 g.mol⁻¹) in a 10 L cylinder at 15 atm and 34 °C.

Answer: a) 95.33 g mol⁻¹ b) 95.33 g c) 85.80 mol d) 86.65 g 25

5: Calculate the number of moles for CH₄ in a 12 L cylinder at 14 bar and 28 °C.

Answer: a) 6.8 mol b) 6.9 mol c) 6.5 mol d) 6.7 mol 25

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

Answer: a) H₂ b) O₂ c) N₂ d) CO₂ 25

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 25

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

Answer: a) p & V b) T & n c) d) attraction forces & volume of a gas 25

9: It can know the molecular mass of an unknown gas by applying one of the following?

Answer: a) Boyle's law b) Graham's law c) Charles's law d) Gay-Lussac's law 25

10: If V_m is bigger than V_m⁰ then this means the behaviour of a gas is?

Answer: ~~a) Real~~ b) Ideal c) Real & ideal d) Z = 0 25

Q2: A gas sample has a mass of 9.98 g. Its volume is 21.6 L at a temperature of 75.46 °C and a pressure of 641 Torr. Calculate its molar mass.

Q3: A 1.3 mole of Ar gas is placed in a container at 27 °C at a pressure of 725 torr. What is the volume of the container in ml?

Q2
sol

$$PV = nRT$$

~~M~~

$$P = 0.84 \text{ atm}$$

$$V = 21.6 \text{ L}$$

$$T = 348.46 \text{ K}$$

$$n = \frac{PV}{RT}$$

$$n = \frac{0.84 \text{ atm} \times 21.6 \text{ L}}{0.0821 \text{ atm} \cdot \text{L} / \text{mol} \cdot \text{K} \times 348.46 \text{ K}} = \frac{18.144 \text{ L}}{28.6}$$

Q2 $\frac{10}{25}$

$$n = 1.86 \text{ mol/L}$$

$$n = \frac{M}{M} \Rightarrow M = 5.36 \text{ mol/L}$$

Q3

$$PV = nRT$$

Q3 $\frac{5}{25}$

$$V = \frac{0.03 \text{ mol} \times 0.0821 \text{ atm} \cdot \text{L} / \text{mol} \cdot \text{K} \times 300 \text{ K}}{0.95 \text{ atm}}$$

$$V = 2.65 \text{ mol}$$

$$V = 0.002 \text{ mL}$$