



Physical Chemistry Chpt One Properties of Gases

60/100

P114

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University of Mustansiriyah 1st Semester-2021

Department of Chemistry 1st Exam-paper D

Q1: Circle the right answer for all of the following: (50 points)

1: According to van der Waal's corrections if $V_{Real} < V_{Perfect}$ of any gas that means the gas has:
 Answer: a) non-polar particles b) polar particles c) small particles d) big particles

2: Calculate the weight of CO₂ gas (44 g.mol⁻¹) in a 0.5 × 10⁴ mL cylinder at 20 × 10² kPa and 25 °C.
 Answer: a) 180 g mol⁻¹ b) 180 g c) 180 mol d) 180 kg

3: Calculate the density of CO₂ placed in a 22.4 × 10³ mL cylinder at 20 × 10² kPa and 298 K.
 Answer: a) 36.06 kg L⁻¹ b) 36.06 g L⁻¹ c) 36.06 g d) 36.06 L⁻¹

4: According to Graham's law the heaviest gas has?
 Answer: a) low rate b) high rate c) middle rate d) low density

5: A gas occupies 20 dm³ at 90 °C and 760 torr pressure. What would be its volume at STP?
 Answer: a) 15.04 mL b) 15.04 dm³ c) 15.04 L⁻¹ d) 15.04 dm³

6: A vessel contains a certain amount of gas at 80 × 10⁵ Pa. The gas is transferred to another tank 20 dm³ with pressure of 20 × 10⁵ Pa. What should be its volume?
 Answer: a) 0.5 L b) 0.5 Pa L c) 0.5 Pa dm³ d) 0.5 L⁻¹

7: According to Avogadro's law n is directly proportional with volume at constant?
 Answer: a) p & V b) T & p c) T & V d) p & n e) R & P

8: Attractive and repulsive forces between particles are present in a?
 Answer: a) perfect gas b) non-ideal gas c) ideal gas d) noble gas

9: It can follow the direct proportional between temperature and volume through the law of
 Answer: a) Van der Waal b) Graham c) Charles d) Gay-Lussac

10: The mol fraction of atmospheric pressure is equal to?
 Answer: a) zero b) one c) two d) three

Q2: The following data have been observed for 10000 mg of CO₂ gas at 273 K. Calculate the best value of the molar mass of CO₂.

p/10 ² kPa	1.00	2.00	3.00
V/L	4.00	7.50	11.75

Q3: A perfect gas undergoes isothermal expansion, which increases its volume by 2.48 dm³. The p_i and V_i of the gas are 2 × 10² kPa and 2.14 dm³, respectively. Calculate the p_f of the gas in (i) bar, (ii) torr. (25 points)

Q2/

$$P_0 = nRT$$

$$1 \times 24 \frac{M}{M} \times 0.082 \times 273$$

$$4 = \frac{10}{M} \times 0.082 \times 273$$

$$4M = 22.466$$

$$M = 56.15 \text{ g/mol}$$

$$10000 \text{ mg} = 1 \text{ g}$$

$$\frac{10000 \text{ M}}{1000} = 1 \text{ g} \equiv 10 \text{ g}$$

? \equiv units

$$PV = nRT$$

$$2 \times 7.5 = \frac{10}{M} \times 0.082 \times 273$$

$$15M = 22.466$$

$$M = 1.53 \text{ g/mol}$$

Q2 $\frac{15}{20}$

$$PV = nRT$$

$$3 \times 11.75 = \frac{10}{M} \times 0.082 \times 273$$

$$36.25M = 22.466$$

$$M = 7.16 \text{ g/mol}$$

Q3 $\frac{5}{25}$

$$Q3/ \text{L} V = 2.48 + 2.14$$

$$\text{الاجابة} = 4.62 \text{ L or dm}^3$$

$$\frac{P_{i1}}{P_{i2}} = \frac{V_{i1}}{V_{i2}}$$

$$\frac{2 \times 10^2}{2 \times 10^2} = \frac{2.48}{4.62} \rightarrow P_f 2.48 = 2 \times 10^2 \times 4.62$$

$$P_f = \frac{9.24}{48}$$