



F20

Physical Chemistry_Chpt_One_Properties of Gases



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Department of Chemistry

1st Exam-paper F

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

(25 points)

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)

Thur_11/11/2021

Best wishes

Dr Abduljabbar I. R. Rushdi

Q2 $\frac{0}{25}$ NO ANSWER, Why?

Q3 / $V_2 = 2.48$, $P_1 = 2 \times 10^2$, $V_1 = 2.14 \text{ dm}^3$

2×10^2
200

∴ بمالاه الحجم يزداد بارتفاع الضغط بقدر نسبة قانون بويلر

~~$P_1 V_1 = P_2 V_2$~~

~~$(1.97) \times (2.14) = P_2 (2.48)$~~

~~$4.2 = P_2 (2.48)$~~

~~$P_2 = \frac{4.2}{2.48} = 1.69 \text{ atm}$~~

تحويل الضغط من الـ Pa إلى الـ atm

$2 \times 10^2 \text{ Pa} = \frac{2 \times 10^2}{101.3} \text{ atm} = 1.97$

1) $P_{\text{air}} = 1.69 \times 101.3 = 171.1$

Q3 $\frac{10}{25}$

2) ~~$T_{\text{air}} = 1.69 \times 1760 = 2974.4$~~

~~760~~