



Physical Chemistry_Chpt_One Properties of Gases

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1st Semester-2021
1st Exam-Repeat_1

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

1: Calculate the weight of C₂H₄ gas (26 g mol⁻¹) in a 10000 Cm³ cylinder at 1520 mmHg and 90 °C.
Answer: a) 17.47 g⁻¹ mol⁻¹ b) 17.47 g⁻¹ c) 17.47 mol d) 17.47 g e) 17.47 mg

2: When V_{Real} > V_{Perfect}, this means that the gas is:
Answer: a) perfect b) noble c) real d) heavy

3: The difference between real and ideal gas equation, that the ideal gas equation is not interested in?
Answer: a) p_{gas} & n_{gas} b) V_{container} & p_{attraction} c) V_{gas} & p_{attraction} d) T_{gas} & p_{gas}

4: Calculate the density of C₂H₄ is placed in a 50000 Cm³ container at 760 torr and 273 K.
Answer: a) 1.16 g⁻¹ L⁻¹ b) 1.16 g⁻¹ L c) 1.16 g L⁻¹ d) 1.16 mg L⁻¹

5: Graham's law studies the _____ of the gas.
Answer: a) flow b) collision c) diffusion d) effusion

6: The right formula of the Dalton's law is?
Answer: a) p_i = χ_i Σ p_i b) p_i = χ_i Σ p_T c) p_T = χ_i Σ p_i d) p_i = χ_T p_T

7: The law of Corresponding states is an evidence that the gas is?
Answer: a) real b) ideal c) expanded d) compressed e) heavy

8: The total mol fractions of atmospheric pressure of air is equal to?
Answer: a) zero b) one c) two d) three

9: A gas occupies 30 × 10⁻³ m³ at 75 °C and 76 CmHg pressure. What would be its volume at STP?
Answer: a) 23.5 dm³ b) 23.5 m² c) 23.5 L⁻¹ d) 23.5 m⁻³

10: When the value of Z > 1 this means the dominated forces are:
Answer: a) attraction b) van der Waal c) repulsion d) compression

Q2: The following data have been observed for 5000 mg of unknown gas at 0 °C. Calculate the best value of the molar mass of this gas, and what is it? (25 points)

p/10 ⁵ Pa	0.75	0.60	0.25
V/dm ³	9.33	11.60	27.50

Q3: A perfect gas undergoes isothermal compression, which reduces its volume by 1.80 dm³. The p_f and V_f of the gas are 197 atm and 2.14 dm³, respectively. Calculate the p_{original} of the gas in (a) bar, (b) torr. (25 points)

Q2 $m = 50g$ $T = 273K$ $P = 0.75 atm$ $V = 9.33L$

1) $PV = nRT$
 $(0.75 atm)(9.33L) = \frac{50g}{M} \times 0.082 \times 273K$

$M = 159.96 g/mol$

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

$6.96 = \frac{50}{M} \times 0.082 \times 273$

$M = 160.8 g/mol$

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

$6.875 = \frac{50}{M} \times 0.082 \times 273$

$M = 162.8 g/mol$

Q2 $\frac{10}{25}$

Q3 $\frac{15}{25}$

Q3 $V_1 = V_r + V_2$
 $= 3.94$

But how?

Q3 $V_1 P_1 = V_2 P_2$ You should apply the values

$P_1 = 107 atm = bar$

$P_1 = 107 \times 260 = 81370 torr$

Q3: The following data have been observed for 5000 mg of unknown gas at 0°C. Calculate the best value of the molar mass of this gas, and what is it?

V/m^3	$P/10^5 Pa$
0.25	0.75
0.50	1.50
0.75	2.25

Q3: A perfect gas undergoes isothermal compression, which reduces its volume by 1.80 dm³. The p and V of the gas are 137 atm and 2.18 dm³, respectively. Calculate the p of the gas in (a) bar, (b) torr. (25 points)