

Name: _____
Period: ____

Review: Gases

I. Pressure

(1) Calculate the pressure when 800 N of force is applied over 40 m².

(2) Calculate the force experienced if 500 Pa of pressure is applied over a surface of 0.20 m².

(3) Complete the following table.

Atmospheres (atm)	Millimeters of Mercury (mmHg)	Pascals (Pa)
	720	
1.45		
		7.45x10 ⁵

II. Dalton's Law

(1) A mixture contains carbon dioxide with a partial pressure of 3.45x10⁵ Pa and oxygen with a partial pressure of 6.75x10⁵ Pa. What is the total pressure of the mixture?

(2) A mixture containing methane and oxygen has a total pressure of 0.75 atm. If the partial pressure of the methane is 0.34 atm, what is the partial pressure of the oxygen?

III. Boyle's Law, Charles' Law, Gay-Lussac's Law, and Combined Gas Law

(1) A sample of 1.2 L of neon at 0.75 atm of pressure is expanded to 4.5 L. What will the resulting pressure be if the temperature remains constant?

(2) A balloon contains 3.45 L of air at 20 °C. What will the volume of the balloon be if the temperature is lowered to 12 °C, if the pressure remains constant?

(3) A gas cylinder has a pressure reading of 4.50x10⁵ Pa at 295 K. At what temperature will the pressure read 6.50x10⁵ Pa, if the volume remains constant?

(4) A sample of oxygen occupies 150 mL at 305 K and 2.4 atm of pressure. What volume will the sample occupy at 350 K and 1.8 atm of pressure?

IV. Avagadro's Law and Ideal Gas Law

- (1) What is the mass of 625 mL of argon gas at STP? How many atoms of argon are contained within this volume?
- (2) What is the volume occupied by 3.02 mol of xenon at 0.950 atm and 485 K?
- (3) What is the volume occupied by 30.2 g of water vapour at 9.80×10^4 Pa and 11 °C.

V. Gas Stoichiometry

(1) Propane (C_3H_8) is combusted with oxygen to produce carbon dioxide and water at STP. If 440 mL of propane react, what volume and mass of oxygen is required? What is the volume and mass of each of the products?

- (2) Nitrogen gas reacts with chlorine gas to produce nitrogen trichloride.
- (a) If 220 L of nitrogen react with 420 L of chlorine at 2.80×10^5 Pa and 600 °C, which reactant is limiting and which is in excess?
- (b) What volume and mass of nitrogen trichloride will be produced?

Answers:

I. Pressure

- (1) 20 Pa
(2) 1.0×10^2 N
(3)

Atmospheres (atm)	Millimeters of Mercury (mmHg)	Pascals (Pa)
0.947	720	9.60×10^4
1.45	1.10×10^3	1.47×10^5
7.35	5.59×10^3	7.45×10^5

II. Dalton's Law

- (1) 1.02×10^6 Pa
(2) 0.41 atm

III. Boyle's Law, Charles' Law, Gay-Lussac's Law, and Combined Gas Law

- (1) 0.20 atm
(2) 3.36 L
(3) 426 K
(4) 0.23 L

IV. Avagadro's Law and Ideal Gas Law

- (1) 1.11 g, 1.68×10^{22} atoms
(2) 127 L
(3) 40.4 L

V. Gas Stoichiometry

- (1) 2.20 L and 3.14 g of O_2 , 1.32 L and 2.59 g of CO_2 , 1.76 L and 1.42 g of H_2O
(2) (a) lim: Cl_2 , ex: N_2
(b) 280 L and 1.3×10^3 g of NCl_3