

2nd Semester Final Review - Gas Laws

- What happens to the volume of a gas as the pressure is increased and the temperature is unchanged? **The volume will decrease. Pressure and volume are inversely proportional $P_1V_1 = P_2V_2$**
- How does a decrease in temperature affect the pressure of a gas in a fixed volume container? **The pressure will decrease also. Temp and pressure are directly proportional. $P_1/T_1 = P_2/T_2$**
- What does an increase in temperature do to the volume of a gas at constant pressure? **The volume will increase also. Temp and volume are directly proportional. $V_1/T_1 = V_2/T_2$**
- Circle the greatest value in each pair
 - 60.0°C or 250 K
 - 1.5 atm or 750 torr
 - 3.5 L or 4500 mL
 - 375 K or 10°C
- Suppose we have a sample of ammonia gas with a volume of 3.5 L at a pressure of 1.68 atm. The gas is compressed to a volume of 1.35 L at a constant temperature. Calculate the final pressure. **$P_1V_1 = P_2V_2$ 4.4 atm**
- A sample of methane gas has a volume of 3.8 L at 5.0°C. If the sample is heated to 30.0°C at a constant pressure, what would be the new volume? **$V_1/T_1 = V_2/T_2$ Temp must be in Kelvin 4.1 L**
- A sample of gas has a pressure of 345 mm Hg at a temperature of -15°C and a volume of 3.48 L. If conditions are changed so that the temperature is 26°C and the pressure is 468 mm Hg, what will be the volume of the sample? **$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ Temp must be in Kelvin 2.97 L**
- The gaseous product of a reaction is collected in a 25.0 L container at 27°C. The pressure in the container is 216 kPa and the gas has a mass of 96.0 g. What is the molar mass of the gas? **$PV = nRT$ $n = \frac{PV}{RT}$ molar mass = g/mol 44.2 g/mol**
- A mixture of gases at a total pressure of 145.0 kPa contains N₂, CO₂ and O₂. The partial pressure of the N₂ is 28.5 kPa and the partial pressure of the CO₂ is 76.0 kPa. What is the partial pressure of the O₂? **$P_{\text{total}} = P_{\text{N}_2} + P_{\text{CO}_2} + P_{\text{O}_2}$ $P_{\text{O}_2} = 40.5 \text{ kPa}$**
- How many moles of Hydrogen gas are there in 35 L of hydrogen at STP? **1.6 L H₂
1 mole of any gas at STP = 22.4 L**
- How many moles of Hydrogen gas are there is 35 L of hydrogen at 2.0 atm and 125°C? **$PV = nRT$ 2.1 L H₂**
- What is the volume of 25.0 g of CO₂ (g) at STP? **12.7 L CO₂**
- What is the volume of 25.0 g of CO₂(g) at 750 torr and 25°C? **14.1 L CO₂**
- Oxygen is often generated in the laboratory by the reaction between sodium peroxide (Na₂O₂) and water, under appropriate conditions. Sodium hydroxide is the other product.
 - Write the balanced equation. **$2\text{Na}_2\text{O}_2 + 2\text{H}_2\text{O} \rightarrow \text{O}_2 + 4\text{NaOH}$**
 - How many grams of Na₂O₂ must be used to generate 1.5 L of oxygen at 25°C and 1.2 atm? **11.466 g Na₂O₂ = 11 g Na₂O₂ with 2 sig figs**

