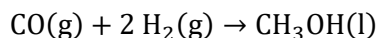


- Write a Lewis structure for each of the following molecules.
 A. NF_3 B. HBr C. SBr_2 D. CCl_4
- Write the best Lewis structure for each of the following species. Label nonzero formal charges.
 A. SO_4^{2-} B. BrO_2^- C. I_3^- D. AsF_6^-
- Write the best Lewis structure for each of the following molecules or ions. Assign formal charges to each atom. If the best Lewis structure has equivalent resonance structures, include all of them and assign formal charges to each atom.
 A. ClO_3^- B. SeO_2 C. NH_4^+
- Determine the electron geometry, molecular geometry, bond angles, hybridization, and number of sigma and pi bonds in each of the following molecules.
 A. ClO_2F B. IF_2NO C. H_3O^+ D. IBr_4^-
- Determine whether each of the following molecules is polar or nonpolar.
 A. KrF_2 B. SCl_2 C. IF_5 D. SeF_6
- A cylinder with a moveable piston contains 0.87 moles of a gas and has a volume of 334 mL. What will its volume (in mL) be if an additional 0.22 moles of gas is added to the cylinder at a constant temperature and pressure?
- A syringe containing 1.55 mL of oxygen gas is cooled from 95.3 °C to 0.0 °C. What is the final volume of oxygen gas in mL?
- What is the density (in g/L) of hydrogen gas at 20.0 °C and a pressure of 1.24 atm?
- A sample of gas has a mass of 38.8 mg. Its volume is 224 mL at a temperature of 55 °C and a pressure of 886 torr. Find the molar mass of the gas in g/mol.
- Methanol (CH_3OH) can be synthesized by the following reaction:



What volume (in liters) of hydrogen gas, measured at a temperature of 355 K and a pressure of 738 mmHg, is required to synthesize 35.7 g of methanol?

- A 12.5 L scuba diving tank is filled with a helium-oxygen (heliox) mixture containing 24.2 g of He and 4.32 g of O_2 at 298 K. Calculate the mole fraction and partial pressure of each component in the mixture and calculate the total pressure.
- To determine the rate of photosynthesis, the oxygen gas emitted by an aquatic plant was collected over water at a temperature of 293 K and a total pressure of 755.2 mmHg. Over a specific time period, a total of 1.02 L of gas was collected. What mass of oxygen gas (in grams) was formed? The vapor pressure of water at 293 K is 17.55 mmHg.
- Calculate the root mean square velocity of nitrogen gas molecules (N_2) at 2.00°C.