

- PSU6.1. A sample of SF<sub>6</sub> occupies a container of variable volume. If the the sample originally occupies a volume of 50.0 mL at 755 mmHg, calculate the pressure which must be exerted to lower the volume to 25.0 mL.
- PSU6.2. If the pressure of a sample of an ideal gas, initially at 1.25 atm, is tripled, by what factor will the volume of the gas change?
- PSU6.3. A 545 mL sample of nitrogen gas initially at -220 °C is heated to 100 °C. Calculate the new volume, assuming the pressure does not change.
- PSU6.4. Calculate the volume of 0.390 moles of an ideal gas at 750 mmHg and 23 °C.
- PSU6.5. Calculate the density of SF<sub>6</sub> at 1.00 atm and 0.00 °C.
- PSU6.6. The first laboratory preparation of O<sub>2</sub>, performed by Joseph Priestly, required the heating of mercury (II) oxide,
- $$2\text{HgO}(s) \rightarrow 2\text{Hg}(l) + \text{O}_2(g)$$
- What volume of O<sub>2</sub> at 22.5 °C and 753 mmHg will be produced when 15.3 g of HgO are completely decomposed?
- PSU6.7. Hydrogen, H<sub>2</sub>, can be prepared by passing steam through a hollow air tube which has been heated to high temperature. The reaction is,
- $$4\text{H}_2\text{O}(g) + 3\text{Fe}(s) \rightarrow \text{Fe}_3\text{O}_4(s) + 4\text{H}_2(g)$$
- Calculate the volume of H<sub>2</sub> formed at 0.98 atm and a temperature of 450 °C when 98.3 g of H<sub>2</sub>O are passed through an iron tube.
- PSU6.8. A gaseous mixture contains 3.00 g of N<sub>2</sub>, 0.430 moles of Ar and 2.15 x 10<sup>23</sup> molecules of CH<sub>4</sub>. If the total pressure of the mixture is 3.00 atm, calculate the partial pressure of each component.
- PSU6.9. Explain, in terms of the kinetic molecular model, why increasing the volume of a sample of an ideal gas decreases the pressure of the gas at constant temperature.
- PSU6.10. Rank the following gases in order of rate of diffusion. Explain your order.

Ne, CH<sub>4</sub>, SF<sub>6</sub>, CO<sub>2</sub>