1. (3 points) Aqueous solutions of sodium fluoride and perchloric acid are mixed. Write the net ionic equation for the reaction if any.

   No partial credit.

   \[ \text{H}^+ (aq) + \text{F}^- (aq) \rightarrow \text{HF} (aq) \]  

2. (2 points) What volume of 0.250 M potassium chloride will completely react with 50.0 mL of 0.115 M lead (II) nitrate? (hint: reaction?)
   a. 46.0 mL  
   b. 23.0 mL  
   c. 218 mL  
   d. 109 mL  

3. If the volume of a confined gas is expanded to four times the original volume while its temperature remains constant, what change will be observed?
   a. The pressure of the gas will decrease to 1/4 its original value.
   b. The pressure of the gas will remain unchanged.
   c. The pressure of the gas will decrease to 1/2 its original value.
   d. The pressure of the gas will increase to twice its original value.

4. (3 points) Nitrogen monoxide reacts with oxygen to produce nitrogen dioxide. What mass of oxygen is required to produce 5.00 L nitrogen dioxide at 32.0 °C K and 752 mm Hg? (R = 0.08206 L·atm/mol·K) (reaction?) Show all work with units for credit!

   \[ 2\text{NO}(g) + \text{O}_2(g) \rightarrow 2\text{NO}_2(g) \]

   \[ \frac{\text{PV}}{\text{RT}} = \frac{752 \text{ mmHg} \cdot 1 \text{ atm}}{760 \text{ mmHg} \cdot 0.08206 \text{ L·atm/mol·K} \cdot 305 \text{ K} } \]

   Look at set up.

   + 0.5 for attempt w/ reaction written.

5. Bonus Question (1 point) Have you been reading? Deep sea divers diving below 50m can suffer from nitrogen narcosis, sometimes called rapture of the deep. To minimize the likelihood of this, divers breathe a mixture of oxygen and what other gas?

   Ans: Helium