

Chapter 4 & Chapter 10: All calculations must be shown and include units and chemicals.

6pts 1. A scuba diver's tank contains 0.29 kg of  $O_2$  compressed into a volume of 2.3L. Calculate the pressure inside the tank at  $9.0^\circ C$ .

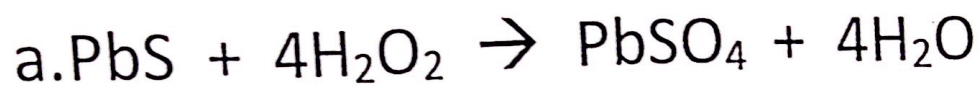
6pts 2. Calculate the density in g/L of sulfur hexafluoride gas at 707torr and  $21^\circ C$ .

6pts 3. 2.55mL of nitrogen gas is compressed in a syringe from  $15.0^\circ C$  to  $-15.0^\circ C$ . Calculate the new volume of the gas.

5pts

BONUS #2: Nicotine is composed of C, H, and N. A 5.250 g sample of nicotine was combusted producing 14.242 grams of CO<sub>2</sub> and 4.083 grams of H<sub>2</sub>O. What is the empirical formula of nicotine? (Use the following molar masses: C = 12.0 g/mol; H = 1.0 g/mol; O = 16.0 g/mol; N = 14.0 g/mol). All calculations must be shown and include units and chemicals.

- 6pts
6. Assign oxidation states to EACH ATOM in the following reaction. (write above the atom). Then explain clearly which atom is the reducing agent.



- 6pts
7. How many grams of ethanol,  $\text{CH}_3\text{CH}_2\text{OH}$ , would you have to dissolve in water to make 1.00L of vodka (which is an aqueous solution that is 6.86M ethanol)?

10pts 4. Write the balanced Molecular, Total IONIC, and Net IONIC equations for the reaction of insoluble  $\text{Al}(\text{OH})_3$  and soluble  $\text{HNO}_3$ . All phases should be shown. The nitrate containing product is soluble as well.



10pts 5. If 27.0mL of 6.0M  $\text{H}_2\text{SO}_4$  was spilled, what is the mass of  $\text{NaHCO}_3$  that must be added to the spill to neutralize the acid? Write a balanced equation to start.