CH1011 Tutorial 2

Name:

1. Draw a **Lewis dot structure** and use **VSEPR theory** to predict the molecular geometry for the chlorofluorocarbon CF_2Cl_2. Would this molecule be polar? - justify your answer.

2. Give the **electronic configuration** for chlorine.

3. How does the **first ionization energy** vary as move down the group 2 elements? Explain the trend.

4. What type of **bonding** would you expect to find in the compound $Mg(OH)_2$? Justify your answer.

5. Identify the following materials as being either **ionic** or **covalent**:
   $CH_3C(=O)OH$, MgO, NF_3, LiF

6. The first step in the reduction of a nickel sulphide ore (Ni_3S_2) to form nickel metal is roasting in air. Balance the following equation and determine how many kg of nickel oxide (NiO) can be formed from 20.0 kg of Ni_3S_2 and 10 m^3 of compressed air (which contains 5.0 kg of oxygen) upon roasting (note the sulphur ends up as sulphur dioxide).

7. When lead nitrate solution { $Pb(NO_3)_2$ } is reacted with sodium iodide solution a precipitate of lead iodide is generated. The reaction goes to completion so this reaction may be used as the basis of a quantitative method for working out the concentration of lead nitrate solutions if a standard sodium iodide solution is available. In such a standardisation experiment 500mL of 0.502M sodium iodide solution was reacted with 70.0mL of lead nitrate to generate 1.256g of lead iodide.
   - ▶ Write down the balanced equation.
   - ▶ What is the concentration of the lead nitrate solution in mol/L?
   - ▶ What is the concentration of the lead nitrate solution in ppm (hint: 1ppm = 1mg/L)?
   - ▶ Would all the sodium iodide have reacted? Justify your answer.

Additional information:

Cl_{17}^{35} Atomic weights: Ni 59, S 32 O 16.