Due: Wednesday, 17-September-2003 by the beginning of class. I want you to be able to get the answers in time to study for the exam, and to ask questions. Remember this is to be your own work.

1) Two grams of a sample of bone was dissolved in hydrochloric acid, giving 50.0 mL of a solution containing CaCl$_2$. To precipitate the calcium ion from this solution, an excess of potassium oxalate (K$_2$C$_2$O$_4$) was added. The precipitate of the calcium oxalate, CaC$_2$O$_4$, massed 1.437 g. What was the molarity of the CaCl$_2$ in the original solution? What is the percent calcium in this bone sample?

2) A metal, M, was converted to the chloride, MCl$_2$. Then a solution of the chloride was treated with silver nitrate to give silver chloride crystals, which were filtered from the solution.

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\text{MCl}_2(\text{aq}) + 2\text{AgNO}_3(\text{aq}) \rightarrow \text{M(NO}_3)_2(\text{aq}) + 2\text{AgCl(s)}
\]

If 2.434 g of the metal gave 7.964 g of silver chloride, what is atomic weight of the metal? What is the metal?

3) The active ingredients in an antacid tablet contained only calcium carbonate and magnesium carbonate. Complete reaction of a sample of the active ingredients required 45.68 mL of 0.08750 M hydrochloric acid. The chloride salts from the reaction were obtained from evaporation of the filtrate from this titration; they massed 0.2100 g. What was the percentage by mass of the calcium carbonate in the active ingredients of the antacid tablet?

4) Balance the following skeleton equations. The reactions occur in acidic or basic aqueous solution, as indicated:

a) $\text{MnO}_4^- + \text{H}_2\text{S} \rightarrow \text{Mn}^{2+} + \text{S}_8$ (basic)
b) $\text{Zn} + \text{NO}_3^- \rightarrow \text{Zn}^{2+} + \text{N}_2\text{O}$ (acidic)
c) $\text{MnO}_4^{2-} \rightarrow \text{MnO}_4^- + \text{MnO}_2$ (basic)
d) $\text{Br}_2 \rightarrow \text{Br}^- + \text{BrO}_3^-$ (acidic)

5) Would you expect a precipitation reaction between an ionic compound which is an electrolyte and an ionic compound which is not an electrolyte? Justify your answer.