2.813 Practice Quiz 1 – Spring 2011
(Please note, this is longer than an typical quiz)

1. ***CO2 from Humanity****: Make an estimate of how much CO2 all of humanity exhales in a year in metric tones. How does this compare with the total for anthropogenic emissions?*

2. *What temperature (K) is required to use carbon-to-carbon monoxide reduction to reduce Zinc oxide to Zinc?*

3. *Do an exergy analysis of the reaction 2Cu2S+3CO2(g) -> 2Cu2O+2SO2, an important reaction in copper smelting.*

4. *In our discussion of "The Mobilization of Materials by Human and Natural Activities", we mentioned that volcanism isn't considered by Klee and Graedel. How does it compare to other natural mobilization?*

5. *Currently the world produces about 100 Mt of NH_3 fertilizer. According to Smil, the energy requirements are about 40 GJ/t NH_3. How does this compare with the minimum work required to make NH_3 (i.e. exergy)?*

6. *Imagine we want to make hydrogen (H_2) for fuel. How do the electrolysis of water and the steam reforming of methane compare? (The reactions in consideration are H_2O -> H_2 +1/2O2 and CH_4+H_2O -> $4H_2$ + CO_2.) Why does the second reaction appear more favorable? What is the trade-off?*