**Half-Life Decay Homework**

Answer the questions on a separate piece of paper, using complete sentences when necessary.

1. Explain half-life.
2. Manganese-56 is a beta emitter with a half-life of 2.6 hrs. What is the mass of manganese-56 in a 1.0 mg sample of the isotope at the end of 10.4 hrs?
3. A sample of thorium-234 has a half-life of 25 days. Will all the thorium undergo radioactive decay in 50 days? Explain.
4. How much of a sample of radioisotope remains after one half-life? After two half-lives?
5. A radioisotope has a half-life of 4 days. How much of a 20 g sample of this radioisotope remains at the end of each time period?
   1. 12 days
   2. 50 days
6. The mass of cobalt-60 in a sample is found to have decreased from 0.800g to 0.200g in a period of 10.5 years. From this information, calculate the half-life of cobalt-60.
7. Why is it important that radioactive isotopes used internally for diagnosis or treatment have relatively short half-lives?
8. A patient is administered 20 mg of iodine-131. How much of this isotope will remain in the body after 40 days if the half-life for iodine-131 is 8 days?
9. If you started with 32 million radioactive atoms, how many would you have left after five half-lives?
10. The radioisotope cesium-137 has a half-life of 30 years. After 85 years you have 125 grams remaining. With this information, calculate how much cesium-137 you start with.