CHM 130: Chapter 18 Homework Problems Key

1. Write nuclear equations for each of the radioactive decay described below:
   a. U-238 decays by alpha emission.
   b. Phosphorus-32 decays by beta emission.
   c. U-239 decays by beta emission.
   d. Carbon-14 decays by beta emission.
   e. Po-214 decays by alpha emission.
   f. Np-237 decays by alpha emission.
   g. Iodine-131 decays by beta emission.
   h. Fr-212 decays by alpha emission.

2. Determine the parent nuclide (X) that produced the daughter nuclide from each of the following nuclear reactions described:

   a. Os-188 is produced when X decays by alpha emission.
   b. Ge-73 is produced when X decays by beta emission.
   c. Th-230 is produced when X decays by alpha emission.
   d. Pu-239 is produced when X decays by beta emission.
   e. Lead-206 is produced when X decays by alpha emission.
   f. Pa-233 is produced when X decays by alpha emission.
   g. Xe-131 is produced when X decays by alpha emission.
   h. Th-234 is produced when X decays by alpha emission and gamma emission.

3. Strontium-90 has a half-life of 28.8 years. What mass of a 75.0 mg sample of Sr-90 remains after 86.4 years?

4. Mo-99 has a half-life of 67 hours. What mass of an 86.0 mg sample of Mo-99 remains after 134 hours?

5. Lead-210 has a half-life of 20.4 years. What mass of a 50.0 mg sample of Pb-210 remains after 81.6 years?

6. Curium-242 has a half-life of 163 days. What mass of a 48.0 mg sample of Cm-242 remains after 489 days?

7. Cf-245 has a half-life of 44 minutes. What mass of a 96.0 mg sample of Cf-245 remains after 2 hours and 12 minutes?

8. Lead-214 has a half-life of 27 minutes. What mass of a 64.0 mg sample of Pb-214 remains after an hour and 48 minutes?