HW-12

The isotope carbon-14, C_6^{14}, is radioactive and has a half-life of 5730 years. If you start with a sample of 1000 carbon-14 nuclei, how many nuclei will still be undecayed in 25000 years?

What time interval is required for the activity of a sample of the radioactive isotope $^{72}_{33}$As to decrease by 90.0% from its original value? The half-life of $^{72}_{33}$As is 26 h.

A freshly prepared sample of a certain radioactive isotope has an activity of 10.0 mCi. After 4.00 h, its activity is 8.00 mCi. Find (a) the decay constant and (b) the half-life. (c) How many atoms of the isotope were contained in the freshly prepared sample? (d) What is the sample's activity 30.0 h after it is prepared?

A sample of radioactive material contains 1.00×10^{15} atoms and has an activity of 6.00×10^{11} Bq. What is its half-life?

22.3. Nuclear waste from power plants may contain ^{239}Pu, a plutonium isotope with a half-life of 24000 years. How long does it take for the stored waste to decay to 10% of its current activity level?

22.12. The activity of a radioisotope is found to decrease by 40% of its original value in 20 days. (a) Calculate the decay constant. (b) What is the half-life?