# CH 222 Chapter Twenty Study Guide

- Be able to characterize the three major types of radiation observed in radioactive decay (namely alpha, beta and gamma radiation.)

- Be able to write a balanced equation for nuclear reactions or transmutations.

- Know how to predict if a particular radioactive particle will decay by alpha, beta or positron emission or by electron capture.

- Know how to calculate the binding energy for a particular isotope and understand what this energy means in terms of nuclear stability.

- Be able to use the various first order rate equations as utilized in this chapter with respect to radioactivity.

- Be able to calculate the radioactive half-life of a radioactive isotope ($t_{1/2}$) from the activity of a sample. Also be able to find the time required for an isotope to decay using the half-life.

- Be able to describe nuclear chain reactions, nuclear fission and nuclear fusion.

- Understand the concept of background radiation. Know some of the sources of background radiation. Know the units used to measure intensity and understand how they pertain to health issues.

- Know some of the uses of radioactivity (carbon dating, medicine, etc.)

- Be able to solve and understand the assigned problems in problem set #6 from the kinetics chapter in our text - many of the radiation techniques stem from this chapter, so a thorough understanding is critical to success.

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