

HPS 102/RAD 102

Study Guide for Examination #1 – February 24, 2003

Know the following material:

1. Definition of radioactivity
2. Atomic structure (electrons, nuclear structure, etc.)
3. How to designate a nuclide, e.g., $^{45}\text{Ca}_2$
4. Definition of isotope, isobar, isotone, isomer, nuclide, radionuclide
5. The four basic forces of nature
6. How n/p ratio influences the stability of the nucleus
7. Be able to draw the line of stability (and label the axes) and identify where the nuclides with high and low n/p ratios are located on the graph
8. Characteristics of alpha, beta, and gamma radiation
9. Four categories of naturally-occurring radionuclides
10. Specifics of alpha decay
11. Specifics (e.g., transitions in nucleus, etc.) of the three types of beta decay
12. Specifics of the two types of gamma decay
13. Discuss the two ways in which a "hole" in the extranuclear cloud of an atom caused by electron capture or internal conversion is removed from the atom.
14. Know which radiations are monoenergetic or polyenergetic, and why.
15. Define and be able to explain the mechanisms of excitation and ionization, and know the definitions of w-value and specific ionization.