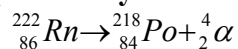


5.3 Balancing Nuclear Equations

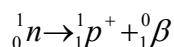
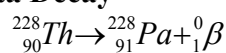
Independent Study

Nuclear reactions, like chemical reactions can be readily represented by equations. However equations for nuclear reactions, unlike those for chemical reactions, use symbols that always include the atomic number and the mass number. A nuclear equation is balanced when the sum of the atomic numbers on the left side is equal to the sum on the right side, and the sum of the mass numbers on the left side equals the sum on the right side. In other words, nucleons are conserved in nuclear reactions. Note that the atomic number identifies the nucleus or particle and the mass number give the specific isotope of an atom.

Alpha Decay

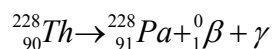
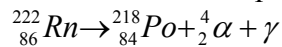


Beta Decay



Gamma Emission

- Emitted when an alpha or beta particle are emitted.



Textbook Reference: 5.3 (p. 216-222)

- Read section 5.3 and prepare the following notes.
 - Answer the questions indicated.
 - A 20 mark multiple-choice test will be given to assess your completion and understanding of this topic.
- List of terms: Prepare a list of the terms and their meanings from this section. Include the terms: **fission**, **binding energy**, and **mass defect** from another source.
 - Summarize the common particles found in nuclear equations: Names and heir symbols.
 - Prepare a table with the following headings: radiation type, brief description, symbol, charge, mass, approx speed of travel, penetration of air, penetrating ability, and effective barrier. (Use table 1 on page 29 in addition to 5.3)
 - Describe how one household device containing a radioactive isotope works.
 - What is a badge dosimeter? Who would use one of these?
 - What is a cyclotron or particle accelerator? What is this device used for?
 - Write the 2 rules that you must follow when balancing a nuclear equation (p. 217) Study and write solutions for Sample Problem 1 and 2 (p. 218, p.219) to show how you would apply these rules.
 - Answer p. 219, Q 1-6
 - Study and record Sample Problem 3 (p. 220) and answer p. 220 Q. 8-10.
 - Study and record Sample Problem 4 and 5 (p. 221-222) and answer p. 222 Q. 12-14.
 - Addition questions p. 222 Q. 3-7