Chemistry I - Standard

Nuclear Equations Practice Set

Remember: If it says radioactive **decay** that particle must go on the PRODUCT side of the reaction.

1. Write what is produced as the following undergo **alpha** decay. Be sure to write in the atomic numbers!
   1. 211 Po → \_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ B. 238 U → \_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_
2. 241 Am → \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_ D. 239 Pu → \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_
3. 60 Co → \_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_
4. Write the products as the following undergo **beta** decay. Be sure to write in the atomic numbers!
   1. 238 Np → \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_ B. 43 K → \_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_
5. 56 Fe → \_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ D. 14 C → \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_
6. Fill in the missing piece of the following decay equations.
   1. \_\_\_\_\_\_\_ → β + 156 Pm
   2. \_\_\_\_\_\_\_ → 4He + 9 Be
   3. 210Pb → β + \_\_\_\_\_\_\_
   4. 253Es + 4He → \_\_\_\_\_\_\_ + 1n
   5. 239Pu + 4He → \_\_\_\_\_\_\_\_\_ + 2 1n + 1H (What does the “2” in front of the neutron mean?)
7. Uranium-238 combines with carbon-12 to make curium-246 and one other particle. Write the equation for this process by filling in the blanks below. Also, supply the short-hand notation for this reaction:

\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_ → \_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_

1. In the first steps of its radioactive decay series, thorium- 232 decays to radium-228. In the second step the radium-228 then decays to actinium-228. Write the two equations for this decay series.
   1. \_\_\_\_\_\_\_\_\_\_\_ → \_\_\_\_\_\_\_\_\_\_\_\_ +  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_→ \_\_\_\_\_\_\_\_\_\_\_\_ +  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. BONUS:

A radioactive decay series begins with 237Np and ends with the formation of stable 209Bi. How many alpha emissions (decays) and how many beta emissions (decays) are involved in the sequence from one isotope to the other.

# alpha emissions: \_\_\_\_\_\_\_

# beta emissions: \_\_\_\_\_\_\_