

Nuclear Physics Practice/Review worksheet #1

Name: _____

1. Which type of radioactive decay does not alter the mass or atomic numbers of the parent nucleus?
2. In the reaction ${}_{43}^{98}\text{Tc} \rightarrow {}_{-1}^0\text{e} + {}_A^Z\text{X} + \bar{\nu}$, what is the daughter product?
3. In the following reaction, identify the missing particle:
 ${}_{82}^{210}\text{Pb} \rightarrow {}_{80}^{206}\text{Hg} + \dots$
4. When a nucleus undergoes beta-minus decay,
 - a. A neutrino is always emitted
 - b. An antineutrino is always emitted
 - c. A gamma ray is always emitted
 - d. A helium nucleus is always emitted
5. When a nucleus undergoes alpha decay,
 - a. Only the atomic number changes
 - b. Only the mass number changes
 - c. Both the mass and atomic numbers change
 - d. Neither the mass nor atomic number changes, as only energy is emitted.
6. Write nuclear equations for the decay of:
 - a. Phosphorus-32 (beta-minus)
 - b. Potassium-40 (beta-plus)
 - c. Oxygen-15 (electron capture)
 - d. Radon-222 (alpha)
7. Carbon-14 is an isotope used in radioactive dating. It emits an electron when it decays. What isotope does it leave behind?
8. Uranium-238 decays spontaneously to produce helium and thorium-234. Why is uranium considered an element rather than a chemical compound of helium and thorium?
9. Uranium 235 is transformed by two alpha decays and then two β^- decays into which isotope?
10. In the thorium series, Thorium 232 is transformed to Thorium 228 by undergoing 3 decay processes. Which of the following series of decays could be responsible for this transformation?
 - a. α, α, β
 - b. β, α, γ
 - c. α, β, β
 - d. β, β, γ