

Nuclear Practice Problems

- Radon-222 undergoes alpha emission with a half life of 3.823 days.
 - Write the balanced alpha emission reaction.

 - If 50.0 grams of radon gas were in a closed basement, how much would be left after 19.00 hours?

- True or False regarding atom stability?
 - In general, calcium and smaller atoms are likely to be stable if their number of protons and neutrons are equal. _____

 - Above uranium all isotopes are unstable AND below uranium all atoms have at least one stable isotope. _____

 - In general, an even number of protons and even number of neutrons is far more likely to be stable than an odd number of protons and odd number of neutrons. _____

- Balance the following transmutation reactions:
 - ${}^{53}_{24}\text{Cr} + {}^4_2\alpha \rightarrow {}^0_1\text{n} + \underline{\hspace{2cm}}$

 - ${}^{238}_{92}\text{U} \rightarrow {}^4_2\alpha + \underline{\hspace{2cm}} + 2 {}^0_0\gamma$

 - ${}^{14}_7\text{N} + {}^4_2\alpha \rightarrow \underline{\hspace{2cm}} + {}^1_1\text{H}$

 - ${}^{27}_{13}\text{Al} + \underline{\hspace{2cm}} \rightarrow {}^{30}_{15}\text{P} + {}^1_0\text{n}$

- What is the decay constant (k) for the radioactive isotope carbon-14 which has a half life of 5730 years? How old is a bone that has only 77.2% of its carbon-14 remaining?