

CHEM105 Chapter Quiz 2**Name on Back Only Please**

Please show all equations, all work, and all units to receive any credit

A significant amount of barium-140 was released during the Chernobyl nuclear plant accident.

1. Identify the number of neutrons, protons, and electrons in a $^{140}\text{Ba}^{2+}$ ion.
2. Write the equation for the expected radioactive nuclear decay of ^{140}Ba . Justify your response.
3. A test was conducted to evaluate the half-life of barium-140. After a period of 50 days, it was found that 6.67% of the original Barium-140 remained. Calculate the half-life of barium-140.
4. Determine the binding energy per nucleon, in units of Joules/nucleus, for the Barium-140 nucleus. The isotopic mass for barium-140 is 139.910605 amu. The masses for a neutron and proton are 1.0087 and 1.0078 amu's respectively.
5. Barium-140 emits beta particles with energies of 0.90 MeV. Calculate the amount of energy released, in Joules, by 1.0 μg of barium-140 when it decays. (Note: 1 electron volt = 1.602×10^{-19} J)