WKS

Name Answer Key

Nuclear Stability & Radioactive Decay WS

Period _____ Date _____

1. What force is responsible for holding the nucleus together? What particles does it act on? Does it work over long or short distances?
   Strong Nuclear Force; It acts on all nucleons (protons & neutrons); short distances.

2. What force acts on protons that are on opposite sides of the nucleus? Is it an attractive or a repulsive force?
   Electric Force (Electrostatic); it is repulsive.

The following questions refer to the "Band of Stability" diagram (see diagram).

3. What does each black dot represent?
   A stable nucleus

4. What is the most stable neutron/proton ratio for lighter elements?
   1:1

5. What is the most stable neutron/proton ratio for heavier elements?
   1.5:1 (or 3:2)

6. In the region above the band of stability, are there too many protons or neutrons?
   neutrons (n/p > 1.5)

7. In the region below the band of stability, are there too many protons or neutrons?
   protons (n/p < 1)

8. What two particles does a neutron decay into (one +, one –)? Write the decay equation that represents this. In what region does this decay occur?
   a proton and an electron (β^- particle): ${}^{1}_{0}n \rightarrow {}^{1}_{1}p + {}^{0}_{-1}e$. It occurs above the band of stability.

9. What two particles does a proton decay into (one +, one neutral)? Write the decay equation that represents this. In what region does this decay occur?
   a positron (β^+) and a neutron: ${}^{1}_{1}p \rightarrow {}^{1}_{0}n + {}^{0}_{+1}e$. It occurs below the band of stability.

10. What is the primary decay mode for atoms with Z>83? What particle(s) are there too many of?
    α-decay. There are too many *nucleons* (protons & neutrons combined).