Nuke Problems

1. Consider an ^{16}O nucleus. Find
    a. Binding energy
    b. BE per nucleon
    c. Conpare the BE/nucleon to that of ^{18}O

2. Write the nuclear equations.
    a. $^{18}N \rightarrow {}^{+}\beta +$ _____
    b. $^{19}O \rightarrow {}^{-}\beta +$ _____
    c. $^{109}Ag \rightarrow \alpha +$ _____
    d. $^{14}C \rightarrow {}^{14}N +$ _____
    e. _____ $\rightarrow {}^{20}N + {}^{+}\beta$

3. Find the energy release in 2a and 2b in MeV and Joules.

4. If 0.0001 g of ^{19}O decays, what is the total energy released?

5. A canister originally contained $2x10^6$ atoms of tritium, ^{3}H. How many atoms of the tritium would remain after 100 years?

6. A researcher had a sample of soudium-22. What fraction would remain after 21 years?

7. A geologist found a rock containing beryllium-10. The ration of boron-10 to beryllium-10 was 2.75 to 1. What is the age of the sample?

8. A scientist had 0.01 g of sodium-24.
    a. Write the decay equation.
    b. How much energy is released per decay?
    c. What mass of sodium-24 remains after 40 hours?
    d. How much energy was release during 40 hours?
    e. What was the initial rate of decay in counts per second?