Name _____ Date _____ Period _____

Energy Ws #6: Radioactivity and Nuclear Energy

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1. The nucleus of an atom is made up of _____ and _____.
2. The number of protons in a nucleus is called the _____ _____.
3. The sum of the number of neutrons and protons is the _____ _____.
4. Atoms that have identical atomic numbers but different mass numbers are called _____.
5. What does it mean to be radioactive?

6. What is a beta particle and what is it's symbol?

7. What is an alpha particle and what is it's symbol?

8. Alpha particle production is a very common mode of _____ for heavy radioactive nuclides.
9. Write the equation for the radioactive decay of radium-222 to give radon –218.

10. What happens in the radioactive decay that produces a beta particle?

11. Write the formula for the radioactive decay of Iodine-131 to Xenon-131.

12. The production of Beta particles results in _____ change in the mass number and a increase of _____ in the atomic number.
13. What is a gamma ray and what is its symbol?
14. Production of a gamma ray results in _____change in mass number and _____ change in atomic number.
15. Often a radioactive nucleus cannot achieve a stable state through a single decay process. In such a case, a _____ _____ occurs until a stable nuclide is formed.

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16. The protons and the neutrons in atomic nuclei are bound together with forces that are much _____ than the forces that bind atoms together to form molecules.
17. Energies that are associated with nuclear processes are more than a _____ times those associated with chemical reactions.
18. Combining two light nuclei to form a heavier nucleus is called _____.
19. Splitting a heavy nucleus into two nuclei with smaller mass number is called _____.
20. Write the equation for the Fission of Uranium-235

21. How much energy is released by this process?
22. Compare the energy released by the nuclear fission of 1 mol of U-235 and the combustion of 1 mol of methane.

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23. Which produces more energy per mole, nuclear fission or nuclear fusion?
24. Our sun gives off vast quantities of energy from the _____ of protons to form _____.