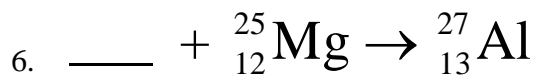
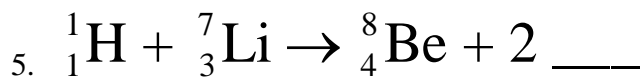
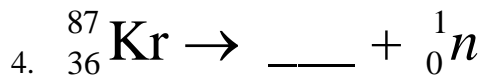
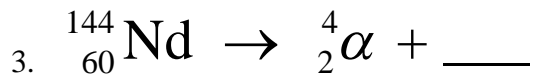
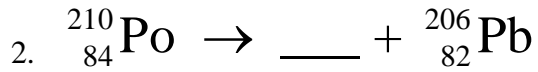
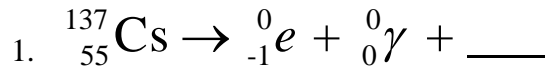


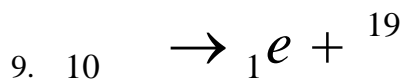
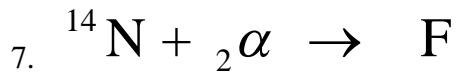
Name: _____

Date: _____

Complete the following nuclear reactions by filling in the missing particle:



Fill in the missing atomic numbers, mass numbers, and/or symbols below:



Write the nuclear reaction based on the descriptions below:

10. The alpha emission of polonium-210

11. The beta emission of protactinium-234

12. The collision of a positron and an electron produced two gamma rays.
13. Oxygen-16 captures an alpha particle to produce neon-20 and a gamma ray.
14. The electron capture of einsteinium-247
15. The positron decay of strontium-83
16. $^{125}_{53}\text{I}$ captures an electron
17. Lead-206 is a daughter nuclide from alpha decay
18. The alpha decay of strontium-90
19. The beta emission of technetium-99
20. The electron capture of radium-221
21. Cadmium-110 releases a gamma ray to stabilize itself
22. Astatine-208 is the daughter nuclide from alpha emission

23. Uranium-235 emits three neutrons and a beta particle during a fission process

24. The positron emission of silver-109

Complete the following problems related to half-lives of radioactive nuclides.

25. If a 100. g sample of thorium-230 is analyzed, how much is left after 3.2×10^5 years?

26. How much oxygen-15 is left after 1650 seconds if the original sample was 0.25 g?

27. After 6.00×10^{19} years, how much of a 0.500 g sample of $^{123}_{52}\text{Te}$ has decayed?

28. Determine the amount of material remaining from a 75.66 g sample of xenon-133 after exactly 1 week.

29. How much iron-55 will decay if a 112.4 g sample is left to decay for 225.3 days?

30. Bismuth-207 is prepared in the lab and allowed to decay for a period of 6.00 years. What is the probable amount of material remaining from a 100.0 g block of this isotope?

How much has decayed over this time?

31. Determine the amount of energy that will be released from the fission of 25.00 g of uranium-235. A single uranium-235 particle is 235.04 amu.

32. Find the energy released from the fusion of hydrogen-3 (3.0150 amu) and hydrogen-1 (1.0079 amu). An alpha particle (4.0026 amu) is produced.

The unit of power, the watt, measures energy usage per second. Thus a 60 watt light bulb consumes 60 joules of energy per second. How long could a light bulb remain lit from the energy produced in the fusion reaction that produces 4.00 g of alpha particles?