Worksheet – Half-Life

Name_____

Date_____

Period_____

SHOW ALL YOUR WORK INCLUDING FORMULA. Box in your answers

1. The half-life of radium-224 is 3.66 days. What was the original mass of this radioactive isotope if 1.2 mg remains after 10.98 days?

2. Potassium-40 was used to date moon rocks. The half-life of this radioactive isotope is 1.28×10^9 years. The oldest lunar rocks were found to be 4.5 billion years old. Approximately how many half-lives has potassium-40 passed through in these rocks?

3. In 1978, a 200 gram sample of cobalt-60 was buried in the Yucca Mountains, just northwest of Las Vegas, Nevada. How much of this sample was present in 2004? The half-life of cobalt-60 is 5.23 years.

4. How much of a 100.0 gram sample of gold-198 is left after 8.10 days if its half-life is 2.70 days?

5. A 50.0 gram sample of Nitrogen-16 decays to 12.5 grams in 14.4 seconds. What is its half-life?

6. The half-life of potassium-42 is 12.4 hours. How much of a 750 gram sample is left after 62.0 hours?

7. What is the half-life of technetium-99 if a 500 gram sample decays to 62.5 grams in 639,000 years?

8. The half-life of Thorium-232 is 1.4 x 1010 years. If there are 25.0 grams of the sample left after 2.8 x 1010 years, how many grams were in the original sample?

9. There are 5.0 grams of Iodine-131 left after 40.35 days. How many grams were in the original sample if its half-life is 8.07 days?

10. If Gallium-68 has a half-life of 68.3 minutes, how much of a 10.0 gram sample is left after one half-life? Two half-lives? Three half-lives?

11. If the passing of five half-lives leaves 25.0 milligrams of a strontium-90 sample, how much was present in the beginning?

12. If polonium-214 has a half-life of 163.7 microseconds, how much of a 1.0 gram sample remains after 818 microseconds?

Review questions

1. Write the balanced nuclear equation for the induced transmutation of aluminum-27 into sodium-24 by neutron bombardment. An alpha particle is released in the reaction.

2. Write the balanced nuclear equation for the alpha particle bombardment of plutonium-239. One of the reaction products is a neutron.