

Half-Life Practice

1. Base your answer to the following question on the information below.

The radioisotopes carbon-14 and nitrogen-16 are present in a living organism. Carbon-14 is commonly used to date a once-living organism.

A sample of wood is found to contain $\frac{1}{8}$ as much C-14 as is present in the wood of a living tree. What is the approximate age, in years, of this sample of wood?

2. A radioactive isotope has a half-life of 2.5 years. Which fraction of the original mass remains unchanged after 10. years?
- A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{1}{8}$ **D) $\frac{1}{16}$**
3. What fraction of a Sr-90 sample remains unchanged after 87.3 years?
- A) $\frac{1}{2}$
B) $\frac{1}{3}$
C) $\frac{1}{4}$
D) $\frac{1}{8}$
4. After decaying for 48 hours, $\frac{1}{16}$ of the original mass of a radioisotope sample remains unchanged. What is the half-life of this radioisotope?
- A) 3.0 h B) 9.6 h **C) 12 h** D) 24 h
5. What is the total number of years that must pass before only 12.50 grams of an original 100.0-gram sample of C-14 remains unchanged?
- A) 2865 y B) 5730 y
C) 11 460 y **D) 17 145 y**
6. What is the half-life of a radioisotope if 25.0 grams of an original 200.-gram sample of the isotope remains unchanged after 11.46 days?
- A) 2.87 d **B) 3.82 d**
C) 11.46 d D) 34.38 d
7. An original sample of a radioisotope had a mass of 80.0 milligrams. Only 20.0 milligrams of this original sample remain unchanged after 8.32 seconds. What is the half-life of this radioisotope?
- A) 1.04s B) 2.08s **C) 4.16s** D) 8.3s
8. In how many days will a 12-gram sample of $^{131}_{53}\text{I}$ decay, leaving a total of 1.5 grams of the original isotope?
- A) 8.0 B) 16 C) 20. **D) 24**
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Answer Key
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1. 17,145 years *or*
3(5715) years

2. **D**

3. **D**

4. **C**

5. **D**

6. **B**

7. **C**

8. **D**
