

HALF-LIFE OF RADIOACTIVE ISOTOPES

Name _____

1. How much of a 100.0 g sample of ^{198}Au is left after 8.10 days if its half-life is 2.70 days?

$$\frac{8.10 \text{ days}}{2.70 \text{ days}} = 3 \text{ } \frac{1}{2}$$

$$100.0 \rightarrow 50.0\text{g} \rightarrow 25.0\text{g} \rightarrow 12.5\text{g}$$

12.5g

2. A 50.0 g sample of ^{16}N decays to 12.5 g in 14.4 seconds. What is its half-life?

$$50.0\text{g} \rightarrow 25.0\text{g} \rightarrow 12.5\text{g}$$

7.2s

3. The half-life of ^{42}K is 12.4 hours. How much of a 750 g sample is left after 62.0 hours?

$$\frac{62.0 \text{ hr}}{12.4 \text{ hr}} = 5 \text{ } \frac{1}{2}$$

$$750\text{g} \rightarrow 375 \rightarrow 187.5 \rightarrow 93.75 \rightarrow 46.875 \rightarrow 23.4\text{g}$$

23.4g

4. What is the half-life of ^{99}Tc if a 500 g sample decays to 62.5 g in 639,000 years?

$$500\text{g} \rightarrow 250\text{g} \rightarrow 125\text{g} \rightarrow 62.5\text{g}$$

$$\frac{639000}{3} = 213000 \text{ yr}$$

213000 yr

5. The half-life of ^{232}Th is 1.4×10^{10} years. If there are 25.0 g of the sample left after 2.8×10^{10} years, how many grams were in the original sample?

$$\frac{2.8 \times 10^{10} \text{ yr}}{1.4 \times 10^{10} \text{ yr}} = 2 \text{ } \frac{1}{2}$$

$$100\text{g} \rightarrow 50.0\text{g} \rightarrow 25.0\text{g}$$

100.0g

6. There are 5.0 g of ^{131}I left after 40.35 days. How many grams were in the original sample if its half-life is 8.07 days?

$$\frac{40.35 \text{ days}}{8.07 \text{ d.}} = 5 \text{ } \frac{1}{2}$$

$$160\text{g} \rightarrow 80.0\text{g} \rightarrow 40.0\text{g} \rightarrow 20.0\text{g} \rightarrow 10.0\text{g} \rightarrow 5.0\text{g}$$

160g