Half-Life, Fission and Fusion

Atomic physics · 4 questions · step-by-step answers at the end

Name: Date: Score: / 4

USEFUL EQUATIONS

fraction left = $(½)^{n}$

Questions

Show your working in the space under each question.

1. A sample has a half-life of 5 days. What fraction remains after 20 days?

2. The corrected count rate from a source falls from 800 counts/min to 100 counts/min in 6.0 hours. Find the half-life.

3. A sample of old wood has 25% of the carbon-14 of living wood. The half-life is 5700 years. How old is it?

4. What do the control rods do in a nuclear reactor?

Step-by-step answers

Half-Life, Fission and Fusion

1. 20/5 = 4 half-lives, so (½)⁴ = **1/16**.

2. 1. 800 → 400 → 200 → 100 is **3 halvings**.
2. Three half-lives take 6.0 hours.
3. Half-life = 6.0/3 = **2.0 hours**.

Answer: 2.0 hours

3. 25% is two half-lives: **11 400 years**.

4. They **absorb neutrons**, so that on average only one neutron from each fission goes on to cause another.