

Non Sibi High School

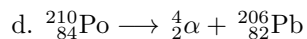
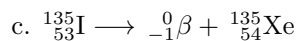
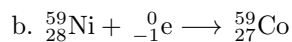
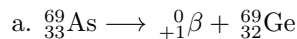
Andover's Chem 550/580: Advanced Chemistry

Chapter 20, Review Quiz 1 Answers

1

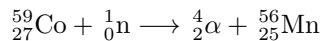
Write balanced equations for the following nuclear reactions:

- Arsenic-69 decays by positron emission.
- Nickel-59 decays by electron capture.
- Iodine-135 decays by beta emission.
- Polonium-210 decays by alpha emission.



2

Neutron bombardment of cobalt-59 produces an alpha particle and a new isotope. Write a balanced equation for this nuclear reaction.



3

The half-life of argon-41 is 1.8 hours. How many atoms will remain if a 3.5×10^{24} atom sample of argon-41 decays for 8.0 hours?

$$\ln Q_f = -\left(\frac{0.693}{1.8 \text{ h}}\right)(8.0 \text{ h}) + \ln(3.5 \times 10^{24} \text{ atoms})$$

$$Q_f = 1.6 \times 10^{23} \text{ atoms}$$

4

The half-life of silver-110 is 25 seconds. How much time is required for an 8.8 g sample of silver-110 to decay to 2.1 g?

$$t = \left(\frac{25 \text{ s}}{0.693} \right) \ln \left(\frac{8.8 \text{ g}}{2.1 \text{ g}} \right) = 52 \text{ s}$$

5

A 3.20 mol sample of zirconium-95 requires 103 days to decay to 1.05 mol. Calculate the half-life of zirconium-95.

$$103 \text{ d} = \left(\frac{t_{1/2}}{0.693} \right) \ln \left(\frac{3.20 \text{ mol}}{1.05 \text{ mol}} \right)$$
$$t_{1/2} = 64.1 \text{ d}$$



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