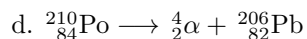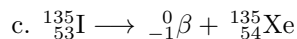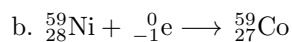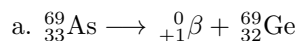# Non Sibi High School

Andover's Chem 250: Introductory/Basic Chemistry

## Chapter 19, Review Quiz 1 Answers

1

Write balanced equations for the following nuclear reactions:

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

    a. $^{69}_{33}\text{As} \longrightarrow {}^{0}_{+1}\beta + {}^{69}_{32}\text{Ge}$

    b. $^{59}_{28}\text{Ni} + {}^{0}_{-1}\text{e} \longrightarrow {}^{59}_{27}\text{Co}$

    c. $^{135}_{53}\text{I} \longrightarrow {}^{0}_{-1}\beta + {}^{135}_{54}\text{Xe}$

    d. $^{210}_{84}\text{Po} \longrightarrow {}^{4}_{2}\alpha + {}^{206}_{82}\text{Pb}$

2

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

$$^{59}_{27}\text{Co} + {}^{1}_{0}\text{n} \longrightarrow {}^{4}_{2}\alpha + {}^{56}_{25}\text{Mn}$$
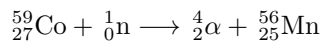
3

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 9.0 hours?

$$h = \frac{9.0\,\text{h}}{1.8\,\text{h}} = 5$$

$$3.5 \times 10^{24}\,\text{atoms} \left(\frac{1}{2}\right)^{5} = 1.1 \times 10^{23}\,\text{atoms}$$

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 1.1 g?

$$8.8\,\text{g} \left(\frac{1}{2}\right)^{h} = 1.1\,\text{g}$$

$$h = 3$$

$$\text{time} = 3 \times 25\,\text{s} = 75\,\text{s}$$

5

A 3.20 mol sample of zirconium-95 requires 384 days to decay to 0.0500 mol. Calculate the half-life of zirconium-95.

$$32.0\,\text{mol} \left(\frac{1}{2}\right)^{h} = 0.0500\,\text{mol}$$

$$h = 6$$

$$t_{1/2} = \frac{384\,\text{d}}{6} = 64.0\,\text{d}$$