

**Example:**

A sample of cesium is 75%  $^{133}\text{Cs}$ , 20%  $^{132}\text{Cs}$ , and 5%  $^{134}\text{Cs}$ .

What is its average atomic mass?

$$\text{Answer: } 0.75 \times 133 = 99.75$$

$$0.20 \times 132 = 26.4$$

$$\underline{0.05 \times 134 = 6.7}$$

$$\text{Total} = \mathbf{132.85 \text{ amu}} \text{ (atomic mass unit)}$$

**Practice:** Determine the average atomic mass of the following mixture of isotopes.

1. 80%  $^{127}\text{I}$ , 17%  $^{126}\text{I}$ , 3%  $^{128}\text{I}$

$$(.80)(127) + (.17)(126) + (.03)(128) = \boxed{126.86 \text{ amu}}$$

OR

$$\frac{(80)(127) + (17)(126) + (3)(128)}{100} = \boxed{126.86 \text{ amu}}$$

2. 15%  $^{55}\text{Fe}$ , 85%  $^{56}\text{Fe}$

$$(.15)(55) + (.85)(56) = \boxed{55.85 \text{ amu}}$$

OR

$$\frac{(15)(55) + (85)(56)}{100} = \boxed{55.85 \text{ amu}}$$

3. 95%  $^{14}\text{N}$ , 3%  $^{15}\text{N}$ , 2%  $^{16}\text{N}$

$$(.95)(14) + (.03)(15) + (.02)(16) = \boxed{14.07 \text{ amu}}$$

4. 98%  $^{12}\text{C}$ , 2%  $^{14}\text{C}$

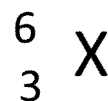
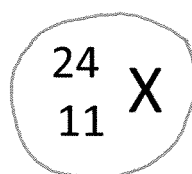
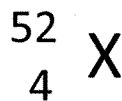
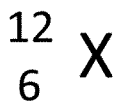
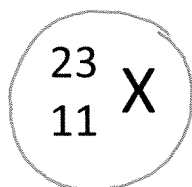
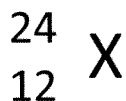
$$(.98)(12) + (.02)(14) = \boxed{12.04 \text{ amu}}$$

OR

$$\frac{(98)(12) + (2)(14)}{100} = \boxed{12.04 \text{ amu}}$$

**Conclusion:** Answer the following questions about isotopes.

5. Circle the symbols that represent isotopes of the same element. = same atomic #



6. Answer the following questions about isotopes.

a. In what ways are isotopes of the same element similar?

Isotopes of the same element have the same number of protons.

b. In what ways are isotopes of the same element different?

Isotopes of the same element have different number of neutrons, thus different masses.