

Isotope Practice

1. Here are three isotopes of an element: ${}^{12}_6\text{C}$ ${}^{13}_6\text{C}$ ${}^{14}_6\text{C}$
- The element is: **Carbon**
 - The number 6 refers to the **Atomic Number**
 - The numbers 12, 13, and 14 refer to the **Mass Number**
 - How many protons and neutrons are in the first isotope? **6 protons & 6 neutrons**
 - How many protons and neutrons are in the second isotope? **6 protons & 7 neutrons**
 - How many protons and neutrons are in the third isotope? **6 protons & 8 neutrons**
2. Complete the following chart:

Isotope name	atomic #	mass #	# of protons	# of neutrons	# of electrons
Potassium-37	19	37	19	18	19
Oxygen-17	8	17	8	9	8
uranium-235	92	235	92	143	92
uranium-238	92	238	92	146	92
boron-10	5	10	5	5	5
boron-11	5	11	5	6	5

DIRECTIONS: For the following problems, show your work! Be thorough.

3. Naturally occurring europium (Eu) consists of two isotopes with a mass of 151 and 153. Europium-151 has an abundance of 48.03% and Europium-153 has an abundance of 51.97%. What is the atomic mass of europium? **Answer: 152.04 amu**
4. Strontium consists of four isotopes with masses of 84 (abundance 0.50%), 86 (abundance of 9.9%), 87 (abundance of 7.0%), and 88 (abundance of 82.6%). Calculate the atomic mass of strontium.
Answer: 87.71 amu
5. Titanium has five common isotopes: ${}^{46}\text{Ti}$ (8.0%), ${}^{47}\text{Ti}$ (7.8%), ${}^{48}\text{Ti}$ (73.4%), ${}^{49}\text{Ti}$ (5.5%), ${}^{50}\text{Ti}$ (5.3%). What is the average atomic mass of titanium?
Answer: 47.92 amu

6. Calculate the atomic mass of copper if copper-63 is 69.17% abundant and copper-65 is 30.83% abundant.

Answer: 63.62 amu

7. Boron exists in two isotopes, boron-10 and boron-11. Based on the atomic mass, which isotope should be more abundant?

Answer: The atomic mass of boron is 10.811; therefore, boron-11 is more abundant because the mass number is closer to the atomic mass.

8. Lithium-6 is 4% abundant and lithium-7 is 96% abundant. What is the average mass of lithium?

Answer: 6.96 amu

9. Iodine is 80% ^{127}I , 17% ^{126}I , and 3% ^{128}I . Calculate the average atomic mass of iodine.

Answer: 126.86 amu

10. The natural abundance for boron isotopes is 19.9% ^{10}B and 80.1% ^{11}B . Calculate boron's atomic mass.

Answer: 126.86 amu

11. Hydrogen is 99% ^1H , 0.8% ^2H , and 0.2% ^3H . Calculate its average atomic mass.

Answer: 1.21 amu

12. Rubidium is a soft, silvery-white metal that has two common isotopes, ^{85}Rb and ^{87}Rb . If the abundance of ^{85}Rb is 80.2% and the abundance of ^{87}Rb is 19.8%, what is the average atomic mass of rubidium?

Answer: 85.40 amu

13. What is the atomic mass of hafnium if, out of every 100 atoms, 5 have a mass of 176, 19 have a mass of 177, 27 have a mass of 178, 14 have a mass of 179, and 35 have a mass of 180.0?

Answer: 178.55 amu