

Isotopes and Atomic Mass Worksheet

Answer the following questions.

- 1) Europium (Eu) naturally consists of two isotopes. ^{151}Eu has an abundance of 48.03% and ^{153}Eu has an abundance of 51.97%. What is the atomic mass of europium?
- 2) Calculate the atomic mass of copper if ^{63}Cu is 69.17% abundant and ^{65}Cu has an abundance of 30.83%.
- 3) Hydrogen is 99% ^1H , 0.8% ^2H , and 0.2% ^3H . Calculate its average atomic mass.
- 4) Strontium (Sr) consists of four isotopes with masses of 84 (abundance of 0.50%), 86 (abundance of 9.9%), 87 (abundance of 7.0%), and 88 (abundance of 82.6%). Calculate the atomic mass of Sr.
- 5) Lithium-6 is 4% abundant, and lithium-7 is 96% abundant. What is the average mass of lithium?
- 6) Iodine (I) is 80% ^{127}I , 17% ^{126}I , and 3% ^{128}I . Calculate the average atomic mass of iodine.
- 7) The natural abundance for boron (B) isotopes is 19.9% ^{10}B and 80.1% ^{11}B . Calculate boron's atomic mass.

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Answers

- 1) Europium (Eu) naturally consists of two isotopes. ^{151}Eu has an abundance of 48.03% and ^{153}Eu has an abundance of 51.97%. What is the atomic mass of europium?

$$\text{Average atomic mass of Eu} = (151 \times 0.4803) + (153 \times 0.5197) = 72.5253 + 79.5141 \\ = 152.0394 \text{ amu}$$

- 2) Calculate the atomic mass of copper if ^{63}Cu is 69.17% abundant and ^{65}Cu has an abundance of 30.83%.

$$\text{Average atomic mass of Cu} = (63 \times 0.6917) + (65 \times 0.3083) = 43.5771 + 20.0395 \\ = 63.6166 \text{ amu}$$

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

$$\text{Average atomic mass of H} = (1 \times 0.99) + (2 \times 0.008) + (3 \times 0.002) = 0.99 + 0.016 + 0.006 \\ = 1.012 \text{ amu}$$

- 4) Strontium (Sr) consists of four isotopes with masses of 84 (abundance of 0.50%), 86 (abundance of 9.9%), 87 (abundance of 7.0%), and 88 (abundance of 82.6%). Calculate the atomic mass of Sr.

$$\text{Average atomic mass of Sr} = (84 \times 0.005) + (86 \times 0.099) + (87 \times 0.07) + (88 \times 0.826) \\ = 0.42 + 8.514 + 6.09 + 72.688 = 87.712 \text{ amu}$$

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

$$\text{Average atomic mass of Li} = (6 \times 0.04) + (7 \times 0.96) = 0.24 + 6.72 = 6.96 \text{ amu}$$

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

$$\text{Average atomic mass of I} = (127 \times 0.8) + (126 \times 0.17) + (128 \times 0.03) = 101.6 + 21.42 + 3.84 \\ = 126.86 \text{ amu}$$

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

$$\text{Average atomic mass of B} = (10 \times 0.199) + (11 \times 0.8) = 1.99 + 8.8 = 10.79 \text{ amu}$$