

Name : _____ Date : _____

Chemistry Average Atomic Mass Worksheet

Answer the following questions.

1. Lithium (Li) has two naturally occurring isotopes - ${}^7\text{Li}$ (abundance 92.5%) and ${}^6\text{Li}$ (abundance 7.5%). With this information, identify the average atomic mass of lithium.
2. Boron (B) has two naturally occurring isotopes - ${}^{10}\text{B}$ (abundance 19.9%) and ${}^{11}\text{B}$ (abundance 80.1%). What is the average atomic mass of boron?
3. What is the average atomic mass of magnesium (Mg), taking into account that the element has three naturally occurring isotopes - ${}^{24}\text{Mg}$ (abundance 78.99%), ${}^{25}\text{Mg}$ (abundance 10%), and ${}^{26}\text{Mg}$ (abundance 11.01%)?
4. Rubidium (Rb) has two isotopes - ${}^{85}\text{Rb}$ (abundance 72.2 %) and ${}^{87}\text{Rb}$ (abundance 27.8 %). What is its average atomic mass?
5. Titanium (Ti) has five isotopes - ${}^{46}\text{Ti}$ (8%), ${}^{47}\text{Ti}$ (7.8%), ${}^{48}\text{Ti}$ (73.4%), ${}^{49}\text{Ti}$ (5.5%), and ${}^{50}\text{Ti}$ (5.3%). What is its average atomic mass?

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Answers

1. Lithium (Li) has two naturally occurring isotopes - ${}^7\text{Li}$ (abundance 92.5%) and ${}^6\text{Li}$ (abundance 7.5%). With this information, identify the average atomic mass of lithium.

$$\text{Average atomic mass of Li} = (7 \times 0.925) + (6 \times 0.075) = 6.475 + 0.45 = 6.925 \text{ amu}$$

2. Boron (B) has two naturally occurring isotopes - ${}^{10}\text{B}$ (abundance 19.9%) and ${}^{11}\text{B}$ (abundance 80.1%). What is the average atomic mass of boron?

$$\text{Average atomic mass of B} = (10 \times 0.199) + (11 \times 0.801) = 1.99 + 8.811 = 10.8 \text{ amu}$$

3. What is the average atomic mass of magnesium (Mg), taking into account that the element has three naturally occurring isotopes - ${}^{24}\text{Mg}$ (abundance 78.99%), ${}^{25}\text{Mg}$ (abundance 10%), and ${}^{26}\text{Mg}$ (abundance 11.01%)?

$$\begin{aligned} \text{Average atomic mass of Mg} &= (24 \times 0.7899) + (25 \times 0.1) + (26 \times 0.1101) \\ &= 18.9576 + 2.5 + 2.8626 = 24.3202 \text{ amu} \end{aligned}$$

4. Rubidium (Rb) has two isotopes - ${}^{85}\text{Rb}$ (abundance 72.2 %) and ${}^{87}\text{Rb}$ (abundance 27.8 %). What is its average atomic mass?

$$\text{Average atomic mass of Rb} = (85 \times 0.722) + (87 \times 0.278) = 61.37 + 24.186 = 85.556 \text{ amu}$$

5. Titanium (Ti) has five isotopes - ${}^{46}\text{Ti}$ (8%), ${}^{47}\text{Ti}$ (7.8%), ${}^{48}\text{Ti}$ (73.4%), ${}^{49}\text{Ti}$ (5.5%), and ${}^{50}\text{Ti}$ (5.3%). What is its average atomic mass?

$$\begin{aligned} \text{Average atomic mass of Ti} &= (46 \times 0.08) + (47 \times 0.078) + (48 \times 0.734) + (49 \times 0.055) \\ &+ (50 \times 0.053) = 3.68 + 3.666 + 35.232 + 2.695 + 2.65 = 47.923 \text{ amu} \end{aligned}$$