

# Average Atomic Mass Calculation Worksheet

Answer the following questions.

1. The metal titanium commonly has five isotopes. These are those isotopes, along with the

$^{46}\text{Ti}$  - 8%

$^{47}\text{Ti}$  - 7.8%

$^{48}\text{Ti}$  - 73.4%

$^{49}\text{Ti}$  - 5.5%

$^{50}\text{Ti}$  - 5.3%

Using this information, determine the average atomic mass of titanium.

2. Complete the table

Isotope	Mass (amu)	Relative Abundance (%)
$^{20}\text{Ne}$	19.992	90.51
$^{21}\text{Ne}$	20.994	
$^{22}\text{Ne}$		9.22

3. Rubidium has two common isotopes,  $^{85}\text{Rb}$  and  $^{87}\text{Rb}$ . If the abundance of  $^{85}\text{Rb}$  is 72.2% and the abundance of  $^{87}\text{Rb}$  is 27.8%, what is the average atomic mass of rubidium?

4. Why is the average atomic mass of a  $^{12}\text{C}$  atom reported as 12.011 amu in the periodic table?

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## Answers

1. The metal titanium commonly has five isotopes. These are those isotopes, along with the

$^{46}\text{Ti}$  - 8%

$^{47}\text{Ti}$  - 7.8%

$^{48}\text{Ti}$  - 73.4%

$^{49}\text{Ti}$  - 5.5%

$^{50}\text{Ti}$  - 5.3%

Using this information, determine the average atomic mass of titanium.

$$\text{Average atomic mass of titanium} = (46 \times 0.08) + (47 \times 0.078) + (48 \times 0.734) + (49 \times 0.055) + (50 \times 0.053) = 3.68 + 3.67 + 35.232 + 2.695 + 2.65 = 47.927 \text{ amu}$$

2. Complete the table

Isotope	Mass (amu)	Relative Abundance (%)
$^{20}\text{Ne}$	19.992	90.51
$^{21}\text{Ne}$	20.994	0.27%
$^{22}\text{Ne}$	22.002	9.22

3. Rubidium has two common isotopes,  $^{85}\text{Rb}$  and  $^{87}\text{Rb}$ . If the abundance of  $^{85}\text{Rb}$  is 72.2% and the abundance of  $^{87}\text{Rb}$  is 27.8%, what is the average atomic mass of rubidium?

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

4. Why is the average atomic mass of a  $^{12}\text{C}$  atom reported as 12.011 amu in the periodic table?

The mass of carbon is reported as 12.011 amu in the periodic table because carbon exists as a mixture of  $^{12}\text{C}$  and  $^{13}\text{C}$ , with the relative abundances of these isotopes being 98.93% and 1.07%, respectively.