

Name : Date :

Isotopes and Average Atomic Mass Chemistry Worksheet

Determine the average atomic masses of the following.

1) Gold (Au) - ^{197}Au (50%) and ^{198}Au (50%)

2) Iron (Fe) - ^{55}Fe (15%) and ^{56}Fe (85%)

3) Iodine (I) - ^{126}I (17%), ^{127}I (80%), and ^{128}I (3%)

4) Hydrogen (H) - ^1H (99%), ^2H (0.8%), and ^3H (0.2%)

5) Carbon (C) - ^{12}C (98%) and ^{14}C (2%)

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Answers

1) Gold (Au) - ^{197}Au (50%) and ^{198}Au (50%)

$$\text{Average atomic mass of Au} = (197 \times 0.5) + (198 \times 0.5) = 98.5 + 99 = 197.5 \text{ amu}$$

2) Iron (Fe) - ^{55}Fe (15%) and ^{56}Fe (85%)

$$\text{Average atomic mass of Fe} = (55 \times 0.15) + (56 \times 0.85) = 8.25 + 47.6 = 55.85 \text{ amu}$$

3) Iodine (I) - ^{126}I (17%), ^{127}I (80%), and ^{128}I (3%)

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

4) Hydrogen (H) - ^1H (99%), ^2H (0.8%), and ^3H (0.2%)

$$\begin{aligned} \text{Average atomic mass of H} &= (1 \times 0.99) + (2 \times 0.008) + (3 \times 0.002) = 9.9 + 0.016 + 0.006 \\ &= 9.922 \text{ amu} \end{aligned}$$

5) Carbon (C) - ^{12}C (98%) and ^{14}C (2%)

$$\text{Average atomic mass of C} = (12 \times 0.98) + (14 \times 0.02) = 11.76 + 0.28 = 12.04 \text{ amu}$$