ANSWER KEY - Academic

EXTRA PRACTICE: Isotopes & Atomic Mass

Name:

se the equation for average atomic mass to answer the following questions. Show all work and correct units to receive full credit.

- 1. Why is the atomic mass of a carbon-12 atom reported as 12.011amu in the periodic table of elements? Because the atomic mass of C-12 on the periodic table is an average atomic mass of all stable, naturally occuring carbon isotopes and its relative percent abundance.
- Copper used in electric wires contains two naturally occurring isotopes of Cu-63 and Cu-65. Cu-63 has a relative abundance of 69.2% (mass = 62.93 amu) and Cu-65 has a relative abundance of 30.8% (mass = 64.93 amu). Calculate the average atomic mass of copper.

Cu-65

[(62.93 amu) (0.692)] + [(64.93 amu) (0.308)] =

= 63.546 amu

[43.54756 amu] + [19.99844 amu] = 101.85

3. Calculate the average atomic mass of sulfur is 95.00% of all sulfur isotopes have an atomic mass of 31.972 amu, 0.76% has an atomic mass of 32.971 amu, and 4.22% have an atomic mass of 33.967 amu.



4. Calculate the average atomic mass of bromine. One isotope of bromine has an atomic mass of 78.92 amu and a relative abundance of 50.69%. The other major isotope of bromine has an atomic mass of 80.92 amu and a relative abundance of 49.31%.

[(78.92 amu)(0.5069)] + [(80.92 amu)(0.4931)] = [40.004548 anu] + [39.901652 anu] = = 79.906 amu

5. Calculate the average atomic mass of lithium, which occurs as two isotopes that have the following atomic masses and relative abundances in nature: 6.017 amu (7.30%) and 7.018 amu (92.70%).

[(6.017amv)(0.0730)] + [(7.018 amv)(0.9270)] = [0.439241 amu] + [6.505686 amu] = = 6.945 amu

 Silicon contains three naturally occurring isotopes with atomic masses and relative abundances of: 27.9769 amu (92.2297%), 28.9765 amu (4.6832%), and 29.9738 amu (3.0872%).

[(27.9769 amu) (0.92297)] + [(28.9765 amu) (0.046832)] + [(29.9738 amu) (0.030872)]= [25.82183939 amu] + [1.357027448 amu] + [0.9253511536 amu] = = 28.104 amu (10000 19189 7. Calculate the average atomic mass of magnesium if its three naturally occurring isotopes are of the following: Mg-24 is 78.70% (mass = 23.985 amu); Mg-25 is 10.13% (mass = 24.986 amu); and Mg-26 is 11.17% (mass = 25.983 amu). Mg-25 Mg-24 [(23.905 amu)(0.7870)] + [(24.986 amu)(0.1013)] + [(25.983 amu)(0.1117)] = [18.876195 amu] + [2.5310818 amu] + [2.9023011 amu] = = 24.310 amu

8. Naturally occurring chlorine that is put in swimming pools is 75.53% Cl-35 (mass = 34.969 amu) and 24.47% Cl-37 (mass = 36.966 amu). Calculate the average atomic mass of chlorine.

C1-35 [(34.969 amu)(0.7553)] + [(36.966 amu)(0.2447)] = [26.4120857 amu] + [9.0455802 amu] = = 35.46 amu