Chemistry 141 Name Key

Dr. Cary Willard

Quiz 2a (20 points) February 7, 2012

1. (4 points) Write the isotopic symbol in the form and X-A for the molybdenum isotope with 51 neutrons.

or Molybdenum -- 93

1. (6 points) Magnesium has three naturally occurring isotopes (Mg-24, Mg-25, and Mg-26). The mass and natural abundance of Mg-24 are 23.9850 and 78.99% respectively. The mass and natural abundance of Mg-26 are 25.9826 amu and 11.01% respectively. Find the mass and natural abundance of Mg-25.

Natural abundance Mg-25 = 100% - (78.99% + 11.01%) = 10.00%

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| --- | --- | --- |
| Mg-24 | 23.9850 amu x 78.99(%) = | 18.94 amu |
| Mg-25 | ?? amu x 10.00(%) =  ?? amu x 10.00(%) = 2.51 amu  ?? amu = 2.51 amu/10.00(%)  = 25.1 amu | = 24.31 amu-(18.94 amu + 2.86 amu)  = 2.51 amu |
| Mg-26 | 25.9826 amu x 11.01(%) == | 2.86 amu |
| average |  | 24.31 amu |

Mass of Mg-25 = 25.1 amu

1. (4 points) A salt crystal has a mass of 0.23 mg. How many NaCl formula units does it contain?
2. (6 points) A metal (M) forms a compound with the formula MCl3. If the compound contains 67.16% Cl by mass, what is the identity of the metal?

M is Cr

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Quiz 2b (20 points) February 7, 2012

1. (4 points) Write the isotopic symbol in the form and X-A for the molybdenum isotope with 54 neutrons.

or Molybdenum -- 96

1. (6 points) Silicon has three naturally occurring isotopes (Si-28, Si-29, and Si-30). The mass and natural abundance of Si-28 are 27.9769 and 92.22% respectively. The mass and natural abundance of Si-30 are 29.974 amu and 3.09% respectively. Find the mass and natural abundance of Si-29.

Natural abundance Si-29 = 100% - (92.22% + 3.09%) = 4.69%

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| --- | --- | --- |
| Si-28 | 27.9769 amu x 92.22(%) = | 25.80 amu |
| Si-29 | ?? amu x 4.69(%) =  ?? amu x 4.69(%) = 1.36 amu  ?? amu = 1.37 amu/4.69(%)  = 29.0 amu | = 28.09 amu-(0.93 amu + 25.80 amu)  = 1.36 amu |
| Si-30 | 29.974 amu x 3.09(%) == | 0.926 amu |
| average |  | 28.09 amu |

Mass of Si-29 = 29.0 amu

1. (4 points) A salt crystal has a mass of 0.41 mg. How many NaCl formula units does it contain?
2. (6 points) A metal (M) forms a compound with the formula MCl3. If the compound contains 64.43% Cl by mass, what is the identity of the metal?

M is Ni