Chemistry I

Isotope Practice

GET IN THE HABIT OF SHOWING ALL WORK (I MEAN THAT!)

1. Iron has four naturally occurring isotopes:
   Fe-54, 53.9396 amu, 5.82%
   Fe-56, _____ amu, ____%
   Fe-57, 56.9354 amu, 2.19%
   Fe-58, 57.9333 amu, 0.33%
   Determine the mass (rounded to the 0.0001amu) and abundance (rounded to the 0.00%) of Fe-56.

2. Boron has two naturally occurring isotopes:
   B-10, 10.0129 amu
   B-11, 11.0093 amu
   Determine the abundance (rounded to the 0.00%) of each isotope.

3. Silicon has three naturally occurring isotopes:
   Si-28, _____ amu, ____%
   Si-29, 28.97649 amu, 4.70%
   Si-30, 29.97376 amu, 3.09%
   Determine the mass (rounded to the 0.00001amu) and abundance (rounded to the 0.00%) of Si-28.

4. Antimony has two naturally occurring isotopes:
   Sb-121, 120.9038 amu
   Sb-123, 122.9041 amu
   Determine the abundance (rounded to the 0.00%) of each isotope.

5. Bromine has two naturally occurring isotopes:
   Br-79, 78.9183 amu, 50.54%
   Br-81, _____ amu, ____%
   Determine the mass (rounded to the 0.0001amu) and abundance (rounded to the 0.00%) of Br-81.

6. Silver has two naturally occurring isotopes:
   Ag-107, 106.90509 amu
   Ag-109, 108.90470 amu
   Determine the abundance (rounded to the 0.00%) of each isotope.

Chemistry I
Isotopes, Moles, Representative Particles, and Mass Practice

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1. Neon has three naturally occurring isotopes:
   Ne-20, 19.99244amu, 90.92%
   Ne-21, 20.99395amu, 0.26%
   Ne-22, _____amu, ____%
   Determine the mass (rounded to the 0.00001amu) and abundance (rounded to the 0.00%) of Ne-22.

2. Gallium has two naturally occurring istopes:
   Ga-69, 68.9257amu
   Ga-71, 70.9249amu
   Determine the abundance (rounded to the 0.00%) of each isotope.

3. How many moles of iron are in 5.00g of iron?

4. Calculate the number of grams of oxygen gas in 15.2mol of oxygen gas.

5. How many representative particles are present in 7.84g of dinitrogen tetroxide, N_2O_4?

6. How many atoms of gold are present in 115g of gold?

7. If you have 9.35×10^{23} ions of aluminum (Al^{3+}), how many grams of aluminum sulfide, Al_2S_3, would you have?

8. When 1.58×10^{24} atoms of chlorine are known to be in a sample of carbon tetrachloride, CCl_4, how many grams of CCl_4 are present in the sample?

9. How many grams of silicon contain 1.48×10^{21} atoms of silicon?

10. 10.0g of lead (II) oxide, PbO, contain how many representative particles of PbO?

11. Calculate the number of moles of iodine in 300g of iodine.

12. Given that the density of aluminum is $2.74 g/cm^3$, calculate the number of aluminum atoms in a sheet of aluminum foil that measures 3cm x 3cm x 0.001cm.

<u>Answers</u>

1. Ne-22, 22.08945amu, 8.82%
2. Ga-69, 60.27%; Ga-71, 39.73%
3. 0.0895mol iron
4. 486g oxygen gas
5. 5.13×10^{22} molecules N_2O_4
6. 3.51×10^{23} atoms gold
7. 117g Al_2S_3
8. 101g CCl_4
9. 0.0691g silicon
10. 2.70×10^{22} formula units PbO
11. 1.18mol iodine
12. 5.50×10^{20} atoms aluminum

Chemistry I (Honors)
Isotopes, Moles, Representative Particles, and Mass

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1. Lead has four naturally occurring isotopes:
   Pb-204, 203.9730amu, 1.48%
   Pb-206, 205.9745amu, 23.60%
   Pb-207, 206.9759amu, 22.60%
   Pb-208, _____amu, _____%
   Determine the mass (rounded to the 0.0001amu) and abundance (rounded to the 0.00%) of Pb-208. (12 pts.)

2. The two naturally occurring isotopes of copper are Cu-63 and Cu-65. Their masses are 62.9298amu and 64.9278amu, respectively. Find the abundances of both isotopes (rounded to the 0.00%). (8 pts.)

3. Tincture of iodine is used as an antiseptic and contains isopropyl alcohol and dissolved iodine. (It's the brown stuff they rub on your before taking blood.) If a particular sample of tincture of iodine contains 0.0400g iodine for every 1.00mL of the solution, determine the number of iodine atoms in a 10.0mL sample of the solution. (12 pts.)

4. Determine the density (in g/cm^3) of tin if 2.97×10^{23} atoms of tin are contained in a 2-cm cube of tin…that means each side of the cube is 2.00 cm…think about its volume. (8pts.)

Chemistry I (Honors)
Isotopes, Moles, Representative Particles, and Mass

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1. Strontium has four naturally occurring isotopes:
   Sr-84, 83.9134 amu, 0.56%
   Sr-86, 85.9094 amu, 9.86%
   Sr-87, 86.9089 amu, 7.02%
   Sr-88, _____amu, _____%
   Determine the mass (rounded to the 0.0001amu) and abundance (rounded to the 0.00%) of Sr-88. (12 pts.)

2. The two naturally occurring isotopes of copper are Cu-63 and Cu-65. Their masses are 62.9298amu and 64.9278amu, respectively. Find the abundances of both isotopes (rounded to the 0.00%). (8 pts.)

3. Dippin' Dots® are made by flash freezing liquid ice cream in liquid nitrogen. If there are 0.870 g of liquid nitrogen for every 1.00mL of liquid nitrogen, determine the number of nitrogen atoms in a 500-mL sample of the liquid nitrogen. (12 pts.)

4. Determine the density (in g/cm^3) of titanium (it's what the shaft of my fake hip is made of, by the by) if 4.54×10^{23} atoms of titanium are contained in a 2-cm cube of titanium…that means each side of the cube is 2 cm…think about its volume. (8 pts.)