Unit II. History of the Atom. Assignment 2. Calculating atomic mass

1. The element boron consists of two isotopes, $^{10}_{5}B$ and $^{11}_{5}B$. Their masses, based on the carbon scale, are 10.01 and 11.01, respectively. The abundance of $^{10}_{5}B$ is 20.0% and the abundance of $^{11}_{5}B$ is 80.0%. What is the atomic mass of boron?

2. A chlorine sample is found to have two principle isotopes Cl-35 (actual mass is 34.968852) and Cl- 37 (actual mass is 36.965903) with percentage abundances of 75.77% and 24.23% respectively. Calculate the atomic mass of this sample of chlorine.

3. A sample of silicon was found to have 3 isotopes Si-28 (actual mass- 27.976927), Si- 29 (actual mass- 28.976495) and Si-30 (actual mass- 29.973770) with the percent abundances of 92.23%, 4.67% and 3.10% respectively. Calculate the atomic mass of this silicon sample.

4. Assume that the element Uno (Hassium-Hs) is synthesized and that the sample contains 25.2% ^{272}Uno (271.4 amu), 30.8% ^{273}Uno (272.3 amu) and 44.0% ^{275}Uno (274.2 amu). What is the value of the atomic weight?

5. Indium (Atomic weight 114.82) has two naturally-occurring isotopes, the predominant one being ^{115}In with isotopic mass 114.9041 and an abundance of 95.72%. Which of the following isotopic weights is the most likely for the other isotope?

6. Antimony (Atomic weight 121.75) has two naturally-occurring isotopes with isotopic weights 120.9038 and 122.9041. What is the percentage abundance of the heavier isotope?

7. Chromium (Atomic weight 51.996) has four naturally-occurring isotopes. Three of these are ^{50}Cr with isotopic weight 49.9461 (abundance 4.31%), ^{52}Cr with isotopic weight 51.9405 (abundance 83.76%) and ^{54}Cr with isotopic weight 53.9389 (abundance 2.38%) What is the isotopic mass for the fourth isotope?

Answers:
1. 10.8 2. 35.45 3. 28.09 4. 272.9 5. 112.9391 6. 42.30% 7. 52.9237