6

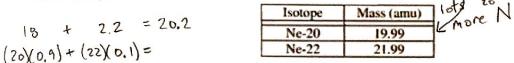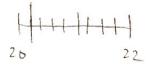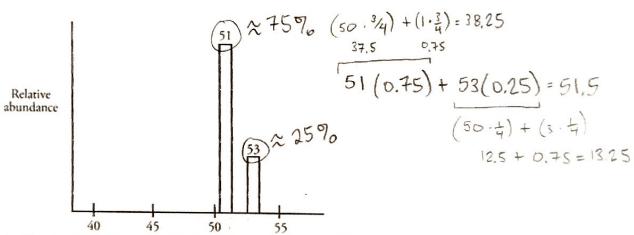**Multiple Choice Practice:** Average Atomic Mass and Atomic Structure, Yum!

6. The average atomic mass of naturally occurring neon is 20.18 amu. There are two common isotopes of naturally occurring neon as indicated in the table below. Using the information provided, calculate the percent abundance of each isotope.

$18 + 2.2 = 20.2$

$(20)(0.9) + (22)(0.1) =$

Isotope	Mass (amu)
Ne-20	19.99
Ne-22	21.99

lots more ^{20}Ne

a.) 90.5% ^{20}Ne and 9.5% ^{22}Ne

✗ 10.5% ^{20}Ne and 89.5% ^{22}Ne

b. 98.2% ^{20}Ne and 1.2% ^{22}Ne

✗d. 56.4% ^{20}Ne and 43.6% ^{22}Ne

(number line sketch: 20 ... 22)

(number line sketch: 51 ... 53)

$\approx 75\%$ (50 · ¾) + (1·¾) = 38.25
   37.5   0.75

$51(0.75) + 53(0.25) = 51.5$

$\approx 25\%$

$(50·¼) + (3·¼)$
$12.5 + 0.75 = 13.25$

Relative abundance

(mass spectrum with peaks at 51 and 53; x-axis: 40 45 50 55)

7. The above mass spectrum is for the hypochlorite ion, ClO^-. Oxygen has only one stable isotope, which has a mass of 16 amu. Using the spectrum, calculate the average mass of a hypochlorite ion.

✗ 52.5 amu   ✗ 52.0 amu   c.) 51.5 amu   d. 51.1 amu

8. Which of the following represents a pair of isotopes?

a. Atom #1: atomic # = 6, mass # = 14; Atom #2: atomic # = 7, mass # = 14

b. Atom #1: atomic # = 6, mass # = 7; Atom #2: atomic # = 14, mass # = 14

c. Atom #1: atomic # = 6, mass # = 14; Atom #2: atomic # = 14, mass # = 28

d.) Atom #1: atomic # = 7, mass # = 13; Atom #2: atomic # = 7, mass # = 14

9. The table below shows the atomic mass and natural abundance of the two naturally occurring isotopes of lithium.

Naturally Occurring Isotopes of Lithium

Isotope	Atomic Mass (u)	Natural Abundance (%)
Li-6	6.015	7.6
Li-7	7.016	92.4

a. $(7.6)(6.015 \text{ amu}) + (92.4)(7.016 \text{ amu})$

c. $(0.076)(6.015 \text{ amu}) + (0.924)(7.016 \text{ amu})$

b. $\dfrac{(7.6)(6.015\ amu)+(92.4)(7.016\ amu)}{2}$

d. $\dfrac{(0.076)(6.015\ amu)+(0.924)(7.016\ amu)}{2}$

Use the table shown below to answer questions #10-11.

Data Table of Isotopes

Set	Number of Protons	Number of Neutrons	Number of Electrons
1	16	16	16
2	15	16	15
3	16	16	15
4	15	15	16

10. Which set of values is correct for a neutral phosphorus atom?

   a. 1   b. 2   c. 3   d. 4

11. Which set(s) correctly identify an isotope of sulfur?

   a. 2 only   b. 1 and 3   c. 1 and 4   d. 1, 2 and 3

12. If the abundance of ^{6}Li (6.015 amu) is 7.50% and the abundance of ^{7}Li (7.016 amu) is 92.5%, what is the average atomic mass?

   a. 6.08 amu   b. 6.92 amu   c. 6.93 amu   d. 6.98 amu