Unit 4 Review Name _____
Basics and Structure of Atoms Period_____ Date_____

Topics:

- protons, neutrons, electrons, atomic number, mass number, symbols & properties
- Calculations of average atomic mass of an element given % abundance data.
- Evidence for structure of atom—Thomson CRT, Millikan Oil Drop, Rutherford Gold Foil, Rutherford Protons Chadwick Neutron,
- Mass spectrometer (mass & percent abundance of isotopes)

1) Fill in all missing information for each question: All symbols must have atomic # & mass #

Isotope	Symbol	Number of Protons	Number of Neutrons	Mass Number
a. Helium-3				
b.	$^{6}_{3}Li$			
c.		9	11	
d. Nickel-61				
e.	$^{232}_{90}Th$			
f.		45		103

2) Determine the average atomic mass of iron (Fe) on Mars if it were to have the following % abundance of Fe isotopes on Mars: 20.0% ^{54}Fe (53.940 amu), 75.0% ^{56}Fe (55.935 amu), and 5.0% ^{58}Fe (57.933 amu). Why is this value different from what is listed on the periodic table?

3) In nature, copper exists as two different isotopes, ^{63}Cu and ^{65}Cu. If one looks at the periodic table, one finds that the average atomic mass of copper is 63.55.
   a. Which isotope must be more abundant in nature?
   b. Explain reasoning.

4) Element Z is composed of the following four isotopes: 1.40% Z-204 (203.973 amu), 24.10 % Z-206 (205.974 amu), 22.10% Z-207 (206.976 amu) and 52.40% Z-208 (207.977 amu). Determine the average atomic mass of Z and identify it.

5) What property of electrons ("cathode rays") did Thomson determine? _____
6) How did Thomson know that electrons had a much lower mass than H atoms?

7) Describe JJ. Thomson's model of the atom.

8) What two things were determined by the Oil Drop Experiment? _____
9) Describe the basic results of the oil drop experiment and explain how the results support the conclusion.

10) In the gold foil experiment, why had Rutherford predicted that all of the alpha particles should go straight through the gold foil?

11) Why did most of the alpha particles go straight through the foil and a small number were deflected? (Must answer both parts!)

12) How did Rutherford realize that the ^{1}H atom must be a proton (^{1}p)?

13) What particle was ejected by Be when it was struck with α particles? How did Chadwick know its mass and charge?

14) How does a mass spectrometer separate isotopes?

Answers: 2) 55.6 amu; 4) 207.2 amu