Unit 3A Quiz #1: Atomic Structure

Name: _____

Block: _____ Date: _____

I. Matching: Each scientist may be used <u>once</u> or <u>more than once.</u>

A. Robert Millikan	D. Werner Heisenburg	G. Democritus
B. Louis de Broglie	E. Ernest Rutherford	H. John Dalton
C. James Chadwick	F. J. J. Thompson	İ. Neil Bohr

__**C**__1. Credited with discovering the neutron.

__**F**__ 2. Proposed the Plum Pudding Model

__**G**__ 3. Believed all matter was made of atoms.

__**I**__ 4. Proposed the Planetary Model

__**H**__ 5. Claimed that elements combine to form compounds.

__**I**__ 6. Proposed that electrons orbit the nucleus in fixed energy orbitals.

__**F**__ 7. Proved that cathode rays were negatively charged particles

__**B**__8. Proposed that electron orbitals have different shapes

__**E**__ 9. Experiment proved that positive charged particles were packed in the nucleus

__**H**__ 10. Developed First Atomic Theory

__**A**___11. Calculated the charge to mass ratio of an electron

__**D**__ 12. Position and the velocity of an object cannot both be measured exactly

__**E**__ 13. Performed the Gold Foil Experiment

II. Short Answer and Fill-in-the-Blank.

1. How many neutrons are present in an isotope of ^{50}V? 27

2. What is the isotopic notation for an atom containing 12 protons, 11 neutrons, and 10 electrons? $^{23}_{12}Mg^{+2}$
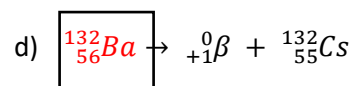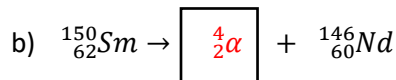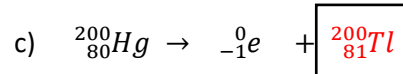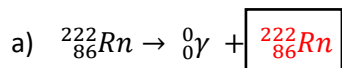
3. The atomic number of an atom is equal to the number of <u>protons in the nucleus</u>.

4. Which subatomic particle is located outside the nucleus? <u>electrons</u>

5. Write the complete isotopic notation for a strontium atom with 126 subatomic particles. $^{88}_{38}Sr$

6. Explain what isotopes are and draw examples in the space below. <u>Isotopes are atoms that have equal number</u>

    <u>protons but a different number of neutrons.</u> $^{12}_{6}C$ $^{13}_{6}C$ $^{14}_{6}C$

7. Balance the following nuclear equations:

a) $^{222}_{86}Rn \rightarrow \ ^{0}_{0}\gamma \ + \boxed{^{222}_{86}Rn}$

c) $^{200}_{80}Hg \ \rightarrow \ ^{0}_{-1}e \ + \boxed{^{200}_{81}Tl}$

b) $^{150}_{62}Sm \rightarrow \boxed{^{4}_{2}\alpha} \ + \ ^{146}_{60}Nd$

d) $\boxed{^{132}_{56}Ba} \rightarrow \ ^{0}_{+1}\beta \ + \ ^{132}_{55}Cs$

8. In order for an atom to be neutral, <u>the number of protons must equal the number of electrons</u>.

9. An isotope with a mass number of 207 and atomic number of 82 would belong to which element? <u>Lead</u>

III. Calculations - **Must show work to earn credit.**

1. Lead has four stable isotopes as shown below. Calculate the average atomic mass to three decimal places.

Isotope	Percent Abundance
^{204}Pb	1.4
^{206}Pb	24.1
^{207}Pb	22.1
^{208}Pb	52.4

(204 x 0.014) + (206 x 0.241) + (207 x 0.221) + (208 x 0.524)
= 207.241 amu

2. Thallium exists as two stable isotopes and has an atomic mass of 204.383 amu. Thallium-203 makes up 29.524% of all naturally occurring thallium atoms. Calculate the mass of the other isotope to three sig figs? Show work for your calculation.

$$100\ \% - 29.524\ \% = 70.476\%$$

$$204.383 = (203 \times 0.29524) + (Mass \times 0.70476)$$

$$\frac{204.383 - (203 \times 0.29524)}{0.70476} = Mass = 204.96 \approx 205\ amu$$

3. How many half-lives will it take for 15 g of radioactive Bismuth-210 to decay to *less than 1 grams*?

15 → 7.5 → 3.75 → 1.875 → 0.9375   4 half-lives

4. Radon-201 undergoes alpha decay every 7.0 seconds. If a 25.0 gram sample of Radon-201 was tested after 105 seconds, how many half-lives have passed?

105/7 = 15 half lives

5. Actinium-225 decays through alpha decay with a half-life of 10 days. If a 30.0 gram sample experiences three half-life cycles, how many grams are left?

30 → 15 → 7.5 → 3.75