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. John Dalton
B. Democritus
C. Robert Millikan

D. Louis de Broglie
E. Werner Heisenburg
F. Neil Bohr
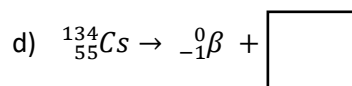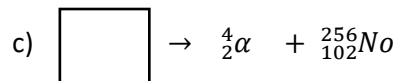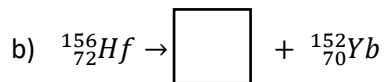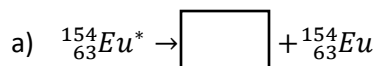
G. James Chadwick
H. J. J. Thompson
İ. Ernest Rutherford

_____ 1. Proposed the Plum Pudding Model

_____ 2. Position and the velocity of an object cannot both be measured exactly

_____ 3. Believed all matter was made of atoms.

_____ 4. Claimed that atoms are indestructible.

_____ 5. Proposed that energy is transferred only in certain well defined quantities.

_____ 6. Performed the Oil Drop Experiment

_____ 7. Proved that cathode rays were negatively charged particles

_____ 8. Performed the Gold Foil Experiment

_____ 9. Proposed the Planetary Model

_____ 10. Bombarded beryllium atoms with alpha particles and noticed neutral particles were produced.

_____ 11. Predicted wave functions of electron orbitals

_____ 12. Experiment proved atoms are mostly empty space

_____ 13. Developed First Atomic Theory

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

1. In order for an atom to be neutral, _____.

2. Explain what isotopes are and draw examples in the space below.

3. An isotope with an atomic number of 30 and a mass number of 64 would belong to which element? _____

4. Write the complete isotopic notation for a potassium atom with 59 subatomic particles.

5. The atomic number of an atom is equal to the number of _____.

6. Which subatomic particle is located outside the nucleus?

7. How many neutrons are present in an isotope of ^{52}Cr?

8. What is the isotopic notation for an atom containing 15 protons, 16 neutrons, and 18 electrons?

9. Balance the following nuclear equations:

a) $^{154}_{63}Eu^* \rightarrow$ ☐ $+ ^{154}_{63}Eu$

b) $^{156}_{72}Hf \rightarrow$ ☐ $+ ^{152}_{70}Yb$

c) ☐ $\rightarrow ^{4}_{2}\alpha + ^{256}_{102}No$

d) $^{134}_{55}Cs \rightarrow ^{0}_{-1}\beta +$ ☐

III. Calculations - Must show work to earn credit.

1. An element has one stable isotope with a relative mass of 84.9118 amu at 72.17% abundance and another stable isotope with a relative mass of 86.9092 amu at 27.83% abundance. Calculate its average atomic mass and identify the element using the periodic table.

2. Bromine exists as two stable isotopes and has an atomic mass of 79.904. Bromine 79 makes up 50.69% of all naturally occurring bromine atoms. What is the mass of the other isotope? Show work for your calculation.

3. Indium (In) has two stable isotopes, ^{113}In and ^{115}In, and about 80 known radioisotopes. Indium-111, having a half-life of 2.8047 days, decays by means of electron capture. If a 25 gram sample of ^{111}In was tested after 19.6329 days, how many half-lives have passed?

4. Bromine-78, a radioactive isotope with a half-life of 6.45 minutes, is known to undergo electron capture. How much time has passed if a sample of bromine-78 has experienced five half-lives?

5. How many half-lives will it take for 100 g of radioactive Americium-243 to decay to *less than 20 grams*?