This plus Unit 2 Assignments #1, 4-9 are excellent prep for Quiz 2.

1. An atom has its identity due to its
   a) \( p^+ \)  b) \( n^0 \)  c) \( e^- \)  d) sum of \( p^+ \) and \( n^0 \)

2. What is the difference between Al – 27 and Al – 28? (2 answers)
   a) \( p^+ \)  b) \( n^0 \)  c) \( e^- \)  d) sum of \( p^+ \) and \( n^0 \)

3. What is the difference between N – 14 and C – 14? (3 answers)
   a) \( p^+ \)  b) \( n^0 \)  c) \( e^- \)  d) sum of \( p^+ \) and \( n^0 \)

For 4 -12, note which subatomic particle(s) is(are) being described:

\[ p^+ \quad n^0 \quad e^- \]

4. Mass = 1 atomic mass unit ("amu" or "u")
5. Charge = zero
6. Located in nucleus
7. Number of these determines nuclear charge
8. Weighs almost zero amu
9. Negatively charged
10. Discovered using C.R.T. experiment
11. Responsible for the nuclear charge of an atom
12. Isotopes have different numbers of ________

How many \( p, n \) and \( e \) are in each of these?

13. Ca – 42
   \( p^+: 20 \quad n^0: 22 \quad e^-: 20 \)

14. Copper – 63
   \( p^+: 29 \quad n^0: 34 \quad e^-: 29 \)

15. \(^{25}\text{Mg}\)
   \( p^+: 12 \quad n^0: 13 \quad e^-: 12 \)

16. Examine this chart. Add to it:
   \[
   \begin{array}{c|ccc}
   \text{Chlorine – 35} & \text{17} p & 17 e & 18 n \\
   \text{Chlorine – 37} & \text{17} p^+ & 17 e^- & 20 n^0 \\
   \end{array}
   \]

17. How come the overall charge on an atom is zero, even though its nucleus is positively charged?

\[ \# e^- = \# p^+ \]
18. Copper’s isotopes are Cu-63 and Cu-65. Which is more abundant?

How do you know?

\[
\text{Cu-63}
\]

19. Which pair represents isotopes of each other?

a. An atom with 5 protons and 6 neutrons, and another atom with 5 protons and 6 neutrons.

b. An atom with 5 protons and 6 neutrons, and another with 6 protons and 5 neutrons.

c. An atom with 5 protons and 6 neutrons, and another with 5 protons and 5 neutrons.

20. a) Draw another nucleus that shows an isotope of this one:

[Diagram of a nucleus with 8 protons and 10 neutrons]

b) What element is this? ___Oxygen___

c) What is the charge on the nucleus of this atom? ___+8 (b/c 8 p+)___

d) Write the element symbol for my drawing and yours, to include both a mass number and atomic number.

original: \[ ^{18}_8 \text{O} \]

new one: \[ ^{19}_8 \text{O} \]

e) Write the element name for both isotopes, in the form of “element name – some number”

oxygen-18 ← original

oxygen-19 ← new one
Rutherford is famous for his experiment with gold foil.

a. What two observations were made as alpha particles were shot at the gold foil?
   
   - Most e- went right through
   - A few e- bounced back

b. What two conclusions were made about the structure of the atom based on these observations?
   
   1. Atoms are mostly empty space
   2. Atoms have a small, dense, positive nucleus

22. Draw the model of the atom as proposed by the following scientists. Next to your drawing state the discovery made by each scientist that they contributed to the Modern Atomic Theory.

**Dalton:**

- Atoms are indivisible
- You can combine different types of atoms to make compounds

**Thomson:**

- There are negative e- embedded in a positive sphere
- Plum pudding model (or choc chip muffin)

**Rutherford:**

- There is a small, dense, positive nucleus
- Most of an atom is empty space

(on the flip side of this page is a list of terms and concepts you have learned so far that will be on this quiz)