For each of the descriptions below, think of **at least two atoms** that fit the description. Then, draw the **orbital notation** for those atoms.

1. An atom that is diamagnetic
2. An atom that is paramagnetic
3. An ion of a transition metal
4. An ion of a halogen
5. A noble gas

Choose from the following choices to answer questions 6-12. You may use an answer choice more than once.

1. Ba
2. Cs
3. At
4. Rn
5. Hg
6. Has the largest first ionization energy
7. Has the highest electronegativity
8. Has the smallest atomic radius
9. Has the largest electron affinity
10. Reacts explosively in water
11. Has the largest atomic radius
12. Is a halogen

State the following in your own words

1. Hund’s rule
2. Pauli Exclusion Principal
3. Heisenberg Uncertainty Principal
4. Aufbau Process
5. Draw the complete symbol for an atom with 35 protons, 45 neutrons, and 36 electrons.
6. Draw the complete symbol for an atom with 7 protons, 7 neutrons, and 10 electrons.
7. A neutral atom of gallium has a mass number of 71. Determine the number of protons, neutrons, and electrons present.
8. Determine the number of protons, neutrons and electrons in an atom of fluorine-19
9. Draw the electron configuration for a neutral atom of Fe as well as Fe+2 and Fe+3.
10. The nucleus makes up most of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the atom while the electron cloud makes up most of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (mass/volume).
11. Write the electron configuration for the following ions
    1. Ca+2
    2. Br-
    3. Rb+
    4. Ga+3
    5. Se-2

f. Do any of these have the same electron configuration?

g. What is it called when two elements have the same electron configuration?

1. Which element has the electron configuration 1s22s22p63s23p5?
   1. Is this element a solid, liquid, or gas at room temperature?
   2. What is the common charge on this element?
   3. What group is this element in?
2. State the definition of ionization energy as well as the trend.
3. Determine the average atomic mass of the following element “X” WITHOUT using your calculator.

30.00% 60 amu

50.00% 64 amu

20.00% 70 amu

1. A common way to determine the number of electrons that will occupy each energy level is the equation 2n2. For example, in the 2nd energy level, (2\*22=8) 8 electrons can be held.
   1. How many electrons can fit on the 3rd energy level?
   2. What sublevels do these electrons occupy?
2. When an electron is excited and moves to a higher energy level it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ light. When it falls to a lower energy level it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ light.
3. What is used as the standard for atomic mass units?

A new element Q has been discovered. Q has an atomic number of 119 and a mass number of 250.

1. How many neutrons does Q have?
2. Draw the noble gas configuration for selenium.
3. Is this atom diamagnetic or paramagnetic? Explain your answer.
4. Draw the Lewis dot diagram for Q
5. If Q forms an ion, what is the expected charge?

Explain the following statements. Your explanations must include reference to both species.

1. There is an increase in the first ionization energy from Li to Ne
2. The first ionization energy of O is lower than that of N.
3. A sample of nickel chloride is attracted into a magnetic field, whereas a sample of solid zinc chloride is not.
4. The second ionization energy of potassium is about three times greater than the second ionization energy of calcium.