

1. A piece of silver, chemical symbol Ag , has a mass of 45 g.
 - a. How many moles of silver are present in this sample?

- b. How many atoms are present in this sample?

2. A piece of iron, chemical symbol Fe , is 3 moles.
 - a. How many atoms are present in this sample?

- b. How many grams is the sample?

3. Imagine that a new element was discovered such that it occupied the spot below Rn on the periodic table.
- a. What phase, solid, liquid, or gas would this new element be at room temperature? **SOLID LIQUID GAS**
Explain your reasoning.
- b. Would this new element be very chemically reactive? **YES NO**
Explain your reasoning.
4. When electricity is passed through a sample of a gas phase element, the substance emits a line spectrum and not a continuous spectrum. Explain the significance of this observation in understanding the structure of the atoms.

5. A particular atom has electron energy levels at -13.6 eV, -3.4 eV, -1.5 eV, -0.54 eV, and -0.38 eV. ($1.602 \times 10^{-19} \text{ J} = 1 \text{ eV}$)
- a. How many wavelengths of light could be emitted as the electron makes transitions between these levels? Justify your answer. (You don't need to calculate the wavelengths.)
- b. Suppose the electron makes a transition from the -3.4 eV level to the -13.6 eV level. What is the frequency of the emitted light?
6. Give the full electron configuration and circle the valence electrons for S.
7. Give the full electron configuration and circle the valence electrons for F.
8. How many orbitals are in the fourth shell of an atom? Explain how you arrived at your answer.

9. Which has the greater first ionization energy, Na or Mg? **Na** **Mg**
Explain your reasoning.

10. Which has the greater second ionization energy, Na or Mg? **Na** **Mg**
Explain your reasoning.