**Quiz 7**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. Is today’s experiment a wet lab or a dry lab (1 point)? \_\_\_\_\_dry lab\_\_\_\_\_\_\_\_\_
2. Define shielding and effective nuclear change. What is the connection between the two (4 points)?

Shielding occurs when electrons protect, or shield, other electrons from the full nuclear attraction. The effective nuclear charge is the nuclear charge an electron actually experiences. As the number of electrons, especially inner electrons, increases, the effective nuclear charge decreases.

1. Use electron configurations to account for the stability of the lanthanide ions Ce4+ and Eu2+ (4 points).

Ce: [Xe] 6s2 4f1 5d1

Ce4+: [Xe], which is a noble gas configuration.

Eu: [Xe] 6s2 4f7

Eu2+: [Xe] 4f7, which has a half-filled f subshell.

1. Arrange Cl, K, S in order of increasing atom size (2 points):

Cl (99 pm) < S (103 pm) < K (227 pm)

1. Write the full set of quantum numbers for the following (9 points):

Any set of quantum numbers below is acceptable.

* 1. The outermost electron in an Rb atom.

Rb: [Kr] 5s1

n = 5, l = 0, ml = 0, ms = +1/2

n = 5, l = 0, ml = 0, ms = -1/2

* 1. The electron gained when an S-ion becomes an S2- ion.

S-: [Ne] 3s23p5

S2-: [Ne] 3s23p6

n = 3, l = 1, ml = +1, ms = -1/2

n = 3, l = 1, ml = 0, ms = -1/2

n = 3, l = 1, ml = -1, ms = -1/2

n = 3, l = 1, ml = +1, ms = +1/2

n = 3, l = 1, ml = 0, ms = +1/2

n = 3, l = 1, ml = -1, ms = +1/2

* 1. The electron gained when an F- ions forms from an F atom.

F: [He] 2s22p5

F-: [He] 2s22p6

n = 2, l = 1, ml = +1, ms = -1/2

n = 2, l = 1, ml = 0, ms = -1/2

n = 2, l = 1, ml = -1, ms = -1/2

n = 2, l = 1, ml = +1, ms = +1/2

n = 2, l = 1, ml = 0, ms = +1/2

n = 2, l = 1, ml = -1, ms = +1/2