

Fall 2008 CH301 Worksheet 3—Last half of Chapter 1 in preparation for Quiz 2

1. List the following orbital in order of increasing energy in the hydrogen atom: 1s, 10s, 4p, 4s, 3d
2. What is the ground state electron configuration of S, Sulfur in both the long and short hand notation?
3. What is the ground state electron configuration of metallic Zinc, Zn, written in short hand notation?
4. What is the ground state electron configuration of bromide ion, Br⁻, written in long hand notation?
5. Which of the following pairs of species have the same electron configuration?
 - A. Na⁻ and Ne
 - B. Mg²⁺ and Ar
 - C. Cl⁻ and Li⁺
 - D. Ca⁺ and Ar
 - E. K⁺ and Ar
6. How many unpaired electrons are in the ground state of Cu, copper? For an extra challenge, which subshell contains the unpaired electron.
7. How many electrons are there in the electron shell with principle quantum number $n = 3$?
8. Explain why an electron in a shell farther from the nucleus "feels" less attraction to the nucleus than one closer to it. How does this explain why effective nuclear charge decreases down the periodic table but increases going to the right?
9. How does the effective nuclear charge of an atom influence its size? Use this explanation to explain the periodic trends in atomic radii - do the atoms get larger at the top or bottom? The left or right?
10. Applying knowledge from question 2, which of the following pairs of atoms is larger?

A.	C or Ge	C.	Fr or Na
B.	Sb or Te	D.	N or F

11. What is ionization energy? Explain how ENC effect ionization energy? What are the periodic trends for ionization energy?

12. Define electron affinity. Would you expect its periodic trends to match those of ionization energy? Why or why not? What are the periodic trends for electron affinity?

13. Define electronegativity. Explain its periodic trends. What would you expect to be the most electronegative atom?

14. Write the electron configurations for V, Cr, and Mn.

15. What is the correct electron configuration for Zn^+ ?

16. How many electrons does Tl^{3+} have in its 6s subshell?

17. Write the electron configurations for Ni, Cu, and Zn.

18. Which of the 3 rules for electron configuration do the *d*-block exceptions modify?

19. Which of the following statements are true?

A. An s^1d^5 configuration is at a higher energy than a s^2d^4 configuration.

B. An s^1d^5 configuration is more stable than a s^2d^4 configuration.

C. All ions have the same electron configuration as the neutral element with the same number of electrons.

D. The exceptions to Aufbau can be understood through the tendency to form filled and half-filled subshells over other configurations.

E. Hund's rule predicts the s^1d^5 configuration instead of s^2d^4 , because it avoids pairing up two electrons in the s subshell.

20. What is *always* true about ground-state electron configurations in regards to energy?