Name Answer Key Hour ____

# Chapter 5 Review

**(Honors Chemistry)**

1. Give the shape and number of orbitals in each sublevel:

   S = 1 orbital (sphere)  D= 5 orbitals (clover leaf)

   P= 3 orbitals (dumbbell)  F= 7 orbitals (unknown)

2. In the $2p^4$:

   What does the 2 stand for? Energy Level

   What does the p stand for? Sub level

   What does the 4 stand for? Number of Electrons

3. Give the type of sublevels in the following principal energy levels:

   1: S  2: S, P  3: S, P, d  4: S, P, d, F

4. How many electrons can each of the following sublevels hold?

   4d: 10  6s: 2  3p: 6  5f: 14  2p: 6  4s: 2  3d: 10

5. What is the maximum number of electrons the following energy levels can hold?

   1: 2  2: 8  3: 18  4: 32  5: 50  6: 72

6. Name the following atoms based on their electron configurations:

   a. $1s^2 2s^2 2p^5$ Fluorine

   b. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$ Chromium

   c. $[Kr]\ 5s^2 4d^9$ Silver

7. Draw the orbital diagram for the Rubidium atom and answer questions a – e:

   $[Ar]\ 4s^2 3d^{10} 4p^6 5s^1$

   a. Highest full Energy level? 3

   b. Highest full sublevel? 4p

   c. Highest occupied Energy level? 5

   d. Number of unpaired electrons? 1

   e. Number of empty orbitals? Ø

8. Give the electron configuration for the following: *(use the abbreviated method)*

a. Mn $[Ar]\ 4s^2\ 3d^5$

b. Br $[Ar]\ 4s^2\ 3d^{10}\ 4p^5$

c. Au $[Xe]\ 6s^2\ 4f^{14}\ 5d^9$

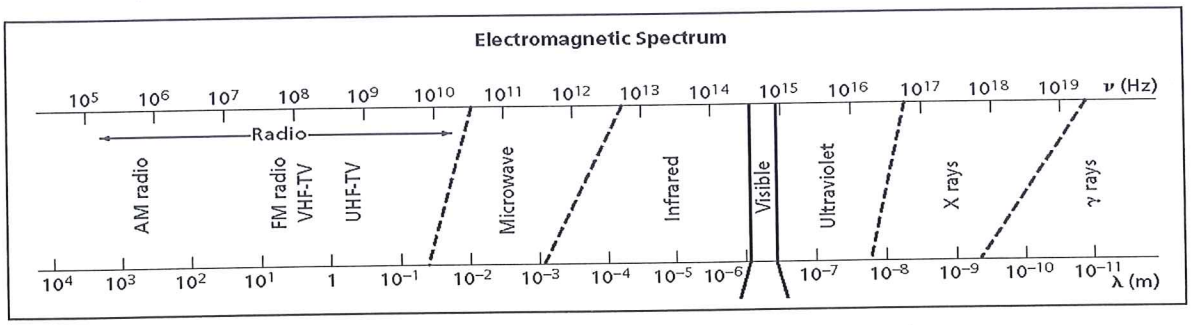
9. Write out the orbital diagram for the following: *(use the abbreviated method)*

a. Ca: $[Ar]$ 4s ↑↓

b. As: $[Ar]$ 4s ↑↓ 3d ↑↓ ↑↓ ↑↓ 4p ↑ ↑ ↑

c. Ti: $[Ar]$ 4s ↑↓ 3d ↑ ↑ □ □ □

10. Use the following diagram to predict answers to a - c, then use the formula to prove it: (Hint: $c = \lambda \cdot \nu$)




a. Your favorite radio station emits radio waves with a wavelength (λ) of $2.35 \times 10^4$ m. What is the frequency (ν) of your favorite radio station? What type of radio waves are they?

$$\nu = \frac{c}{\lambda} = \frac{3.00 \times 10^8\ m/s}{2.35 \times 10^4\ m} = 1.27 \times 10^4\ Hz$$ AM Radio

b. Another popular radio station broadcasts at a frequency (ν) of $6.57 \times 10^7$ Hz. What are the wavelengths (λ) emitted by the radio station? What type of radio waves are they?

$$\lambda = \frac{c}{\nu} = \frac{3.00 \times 10^8\ m/s}{6.57 \times 10^7\ Hz} = 4.57\ m$$ FM Radio

c. A television station broadcasts at a frequency (ν) of $4.87 \times 10^9$ Hz. What are the wavelengths (λ) emitted by the radio station? What type of radio waves are they?

$$\lambda = \frac{c}{\nu} = \frac{3.00 \times 10^8\ m/s}{4.87 \times 10^9\ Hz} = 6.16 \times 10^{-2}\ m$$ UHF-TV

11. What is the Energy of the photon in letters a-c of question 10? ($E_{photon} = h \cdot \nu$)

a. $8.42 \times 10^{-30}$ J b. $4.35 \times 10^{-26}$ J c. $3.23 \times 10^{-24}$ J