Name: Key Period: Date:

Chapters 5 & 6 Review Sheet

If you can follow these questions, your upcoming test on Chapters 5 and 6 will be a breeze.

1. Using the formulas $\mathbf{c = \lambda\nu}$ and $\mathbf{E = h\nu}$, calculate the wavelength and the energy of the blue light emitted by copper chloride in fireworks when they go off. The blue light has a frequency of 6.67×10^{14} Hz. The value of $c = 3.00 \times 10^{8}$ m/s and $h = 6.626 \times 10^{-34}$ Js.

$\lambda = \frac{c}{\nu} = \frac{3\times10^{8}\ m/s}{6.67\times10^{14}\ Hz} = 4.5\times10^{-7}\ m$ wavelength

$E = h\nu = (6.626\times10^{-34}\ J\cdot s)(6.67\times10^{14}\ Hz)$

$E = 4.42\times10^{-19}\ J$ Energy

2. Write each element's orbital notation (arrows) and complete electron configuration.

a. Beryllium At # 4 — 1s ↑↓ | 2s ↑↓ | 2p ___ | 3s ___ | 3p ___ — $1s^2 2s^2$

b. Aluminum At #13 — 1s ↑↓ | 2s ↑↓ | 2p ↑↓ ↑↓ ↑↓ | 3s ↑↓ | 3p ↑ ___ ___ — $1s^2 2s^2 2p^6 3s^2 3p^1$

c. Nitrogen At #7 — 1s ↑↓ | 2s ↑↓ | 2p ↑ ↑ ↑ | 3s ___ | 3p ___ ___ ___ — $1s^2 2s^2 2p^3$

d. Sodium At #11 — 1s ↑↓ | 2s ↑↓ | 2p ↑↓ ↑↓ ↑↓ | 3s ↑ | 3p ___ ___ ___ — $1s^2 2s^2 2p^6 3s^1$

3. What are the aufbau principle and Hund's rule?

Aufbau - All electrons should fill in lower energy levels first.

Hund's - each subshell in an orbital gets 1 electron before any subshell gets a second electron.

4. Use the noble gas notation to write the electron configuration of the elements represented by the following symbols.

a. Rb #37 $[Kr]5s^1$

b. P #15 $[Ne]3s^2 3p^3$

c. Zr #40 $[Kr]5s^2 4d^2$

d. Pb #82 $[Xe]6s^2 4f^{14} 5d^{10} 6p^2$

5. What element is represented by each electron configuration?

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

b. $[Ar]4s^2$ Ca

c. $[Xe]6s^2 4f^4$ Nd

d. $[Kr]5s^2 4d^{10} 5p^4$ Te

e. $[Rn]7s^2 5f^{12}$ Fm

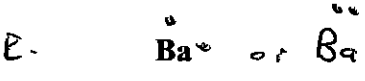
f. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$ I

6. Determine the number of valence electrons in an atom of each element and draw the electron-dot structure of each atom.

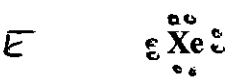
a. Carbon 4 V.E. 

b. Arsenic 5 V.E 

c. Polonium 6 VE 

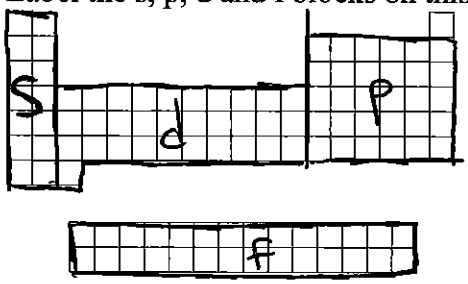
d. Barium 2 V.E. 

e. Potassium 1 VE 

f. Xenon 8 VE 

7. If a scientist discovered an element with 117 protons:
   a. What group/family would it be in? Halogens
   b. Which period would it be part of? 7
   c. Would it be a metal, nonmetal or metalloid? Non-metal
   d. How many valence electrons would it have? 7
   e. Which energy level would the valence electrons be located? 7th
   f. Would it be the largest or smallest atom in its family? Largest
   g. Would it have the greatest or smallest ionization energy in its family? Smallest
   h. Would it be larger or smaller than the an atom of the element TO ITS LEFT on the periodic table? Smaller

8. Label the s, p, d and f blocks on this blank periodic table.



9. Barium is a metal that gives a green color to fireworks. Write the electron configuration for barium. Classify it according to group, period and block in the periodic table.

Ba $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2$ or $[Xe]6s^2$

Barium: Alkaline Earth Metal
Period 6
S-block

10. Which element has the most similar chemical properties to bismuth (Atomic # 83)? Why?
Pb, Sn, Sb, Te, Po

Sb - it is closest element in the same family

11. Why is sodium more chemically similar to potassium than cesium even though they are both alkali metals?

Sodium is closer to potassium in the alkali metal family