

## Electrons and Periodic Table Review

1. Label the periodic table below with the areas named below. Include the entire area for each group.

1		2												3 (13)						4 (14)						5 (15)						6 (16)						7 (17)						8 (18)					
H	Li		Be											B	C	N		O	F		Ne							He																					
Na	K		Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr							Xe																							
Rb	Cs		Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn																														
Fr	Ra		Ac	Rf	Db	Sg	Bh	Hs	Mt	Uu	Uub							Uuq																															

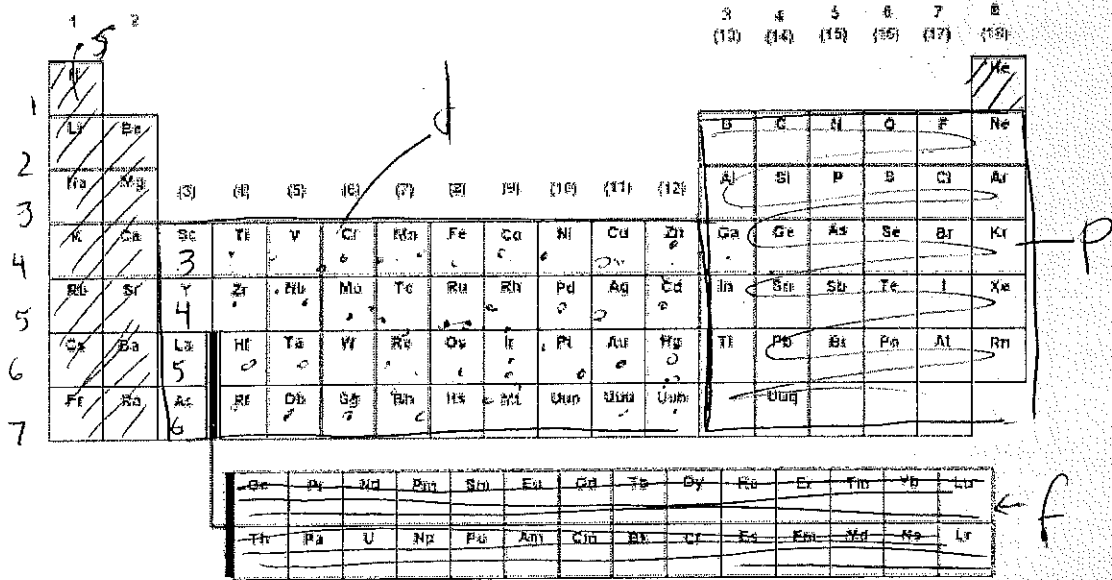
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

- |                          |                |
|--------------------------|----------------|
| a. Metalloids            | g. Halogens    |
| b. Non-metals            | h. Noble Gases |
| c. Metals                | i. Lanthanides |
| d. Alkali Metals         | j. Actinides   |
| e. Alkaline Earth Metals |                |
| f. Transition Metals     |                |

2. Explain how the appearance (and even the existence) of the periodic table may have been influenced by the culture of its creators?

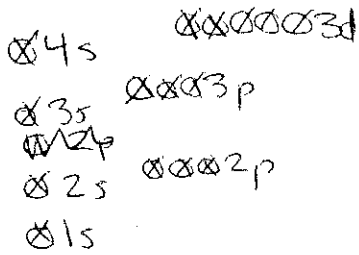
- created by Europeans
- Europeans tend to use rows, columns, straight lines & groups. Have a rectilinear world view.
- ∴ P.T. has rows, columns, straight lines & groups

3. Label the periodic table below with the type of orbital being filled and the shell numbers.

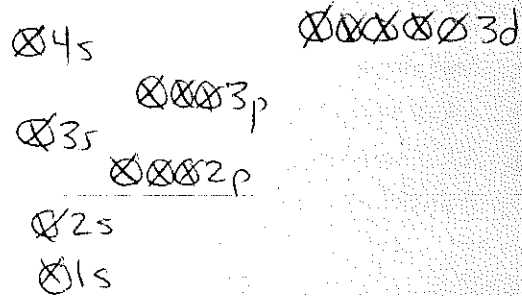


4. For each of the ions or atoms below, draw the orbital diagram. Make sure that you label all orbitals.

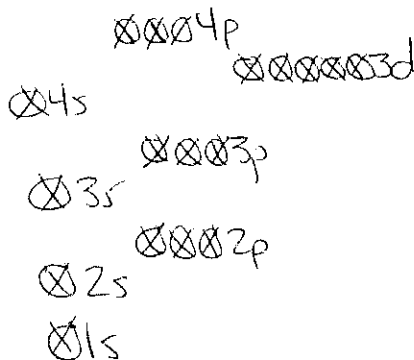
a) Co



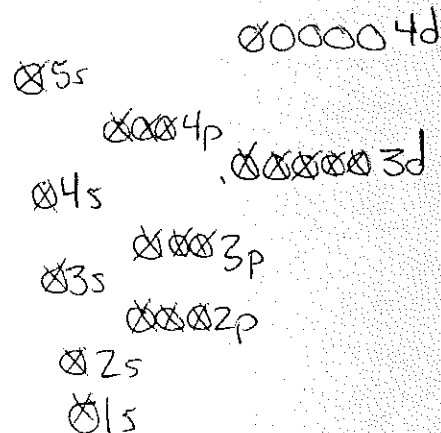
b) Ga<sup>+2</sup>



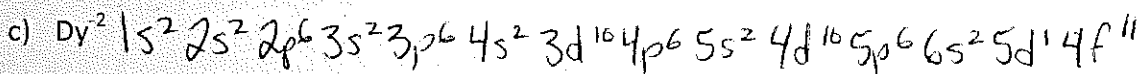
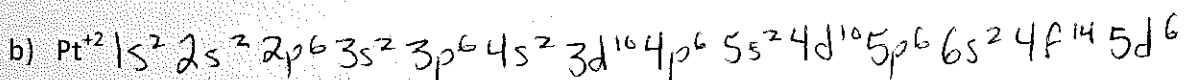
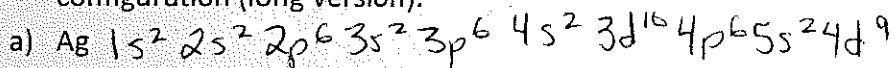
c) As<sup>-2</sup>



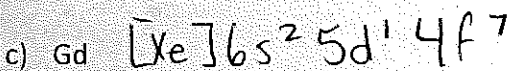
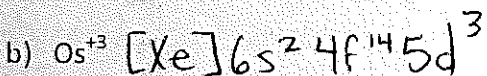
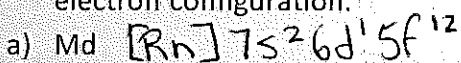
d) Y



5. For each of the atoms or ions below, use the periodic table to write the electron configuration (long version).



6. For each of the atoms or ions below, use the periodic table to write the abbreviated electron configuration.



7. Draw the Lewis Dot Structures for the elements below.

a) Selenium

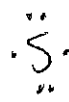
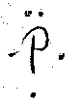
b) Lithium

c) Phosphorus

d) Helium

e) Sulphur

f) Boron



8. Explain what is meant by the following as it pertains to the periodic trends:

a) Sucking Power of the Nucleus: as we go across, we add protons to the nucleus. This increases its sucking power & it pulls  $e^-$  in closer & holds them tighter.

b) Shells: as we go down, electrons are added to shells further from the nucleus. Outer  $e^-$  do not feel the pull of the nucleus as much and are more loosely held.

c) Shielding: as we go down, shells are added. Outer electrons are shielded from the sucking power of the nucleus. Outer electrons are more loosely held.

d) Octet Rule: elements on the left of the periodic table want to lose electrons while elements on the right want to gain. Electrons become harder & harder to remove, & easier and easier to gain from another element.

9. Define the following terms:

- a) Orbital: regions in space where we are most likely to find an electron.
- b) Shell: tells us how far an electron is from the nucleus
- c) Hund's Rule: when  $e^-$  are filling orbitals of equal energy, they will fill singly first, then double up.
- d) Periodic Law: when elements are arranged according to increasing atomic number, properties repeat themselves periodically.
- e) Isoelectronic: elements or ions that have the same electrons  $\therefore$  the same electron structure.
- f) Octet Rule: elements will either lose or gain electrons in order to have a full outer shell of electrons.
- g) Valence Electrons: the electrons in the shell farthest from the nucleus
- h) Core Electrons: the electrons that are not in the valence shell, are closer to the nucleus
- i) Ionization Energy: is the energy it takes to remove an electron from an atom.
- j) Atomic Radius: is the size of the atom
- k) Electronegativity is the ability of an element to bring electrons to itself in a bond.