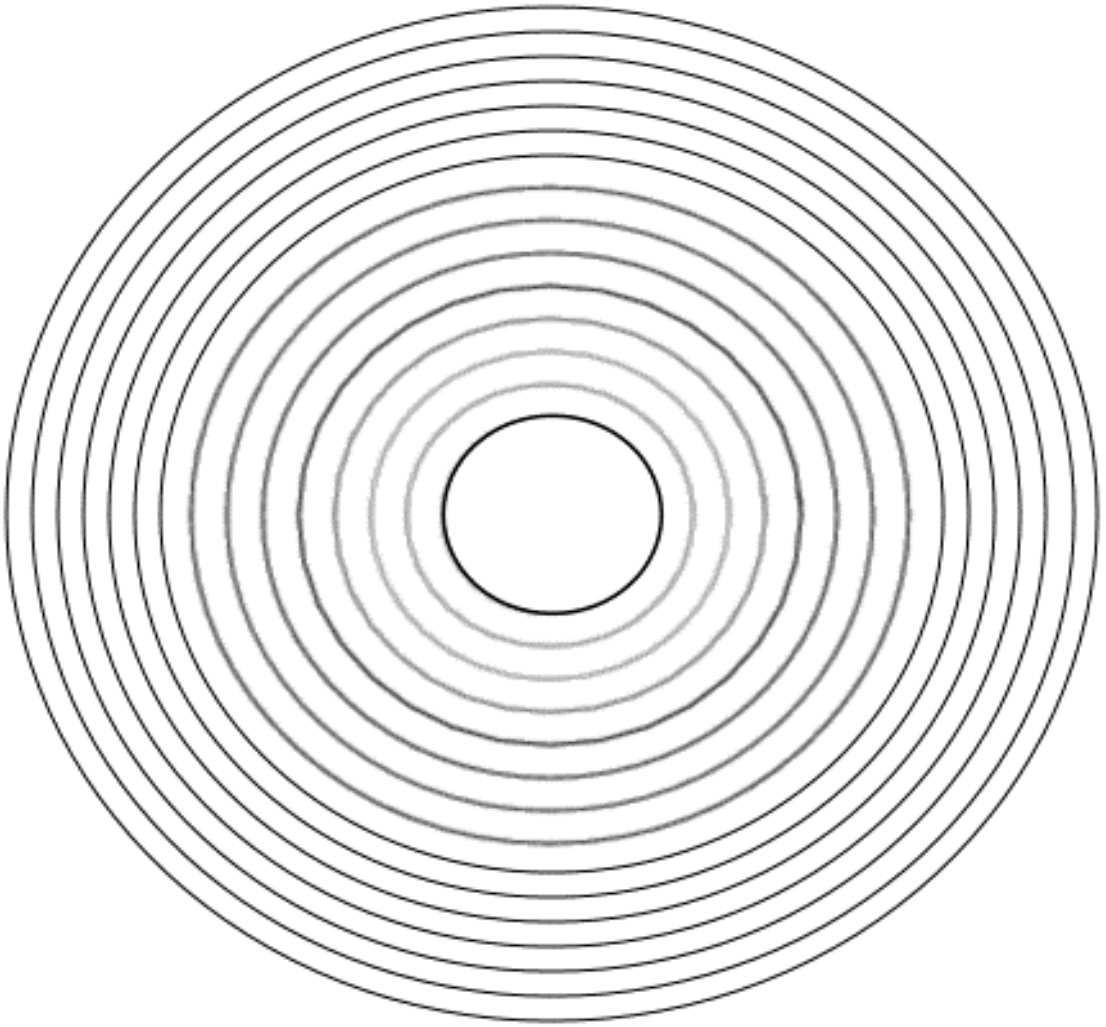
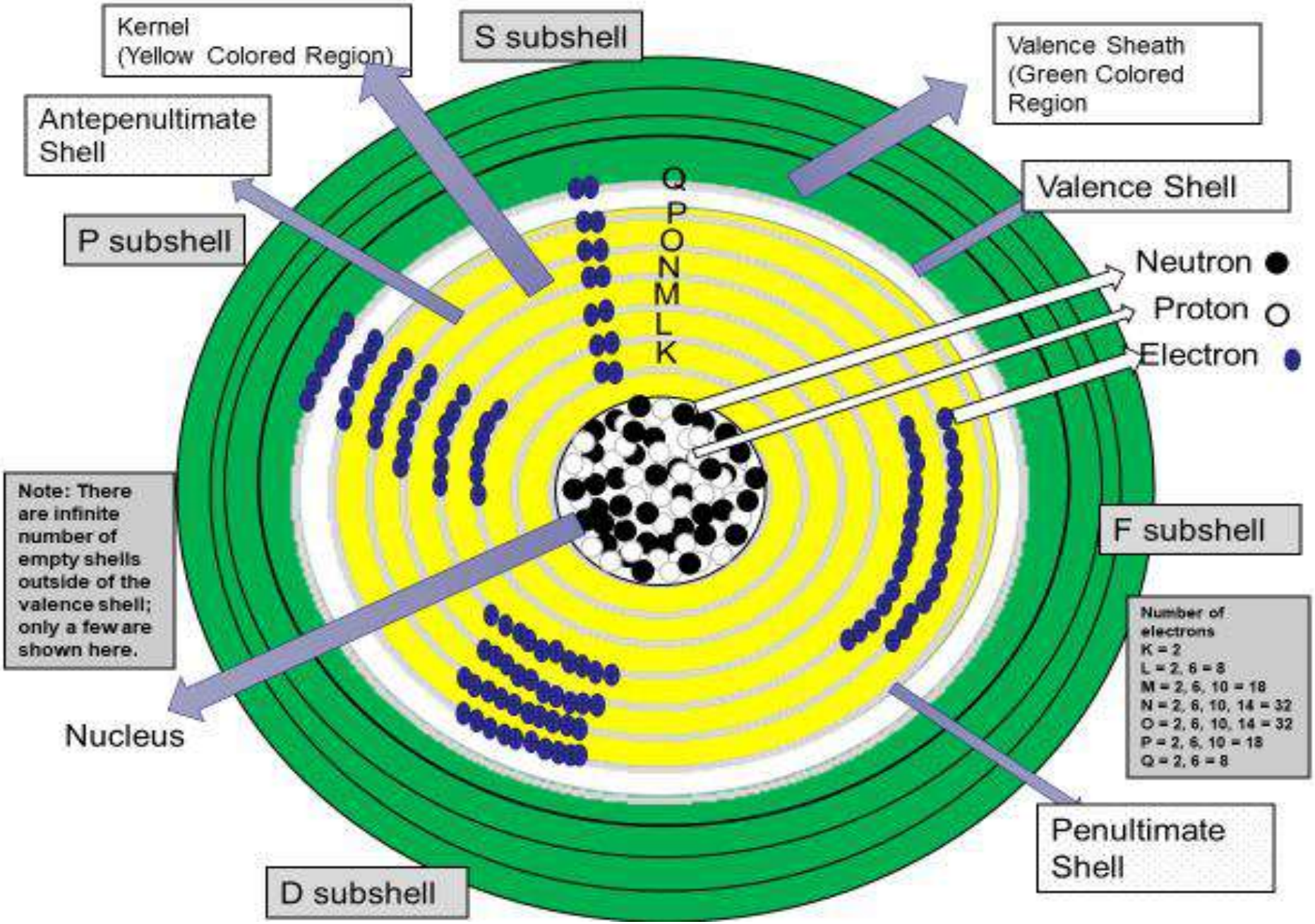
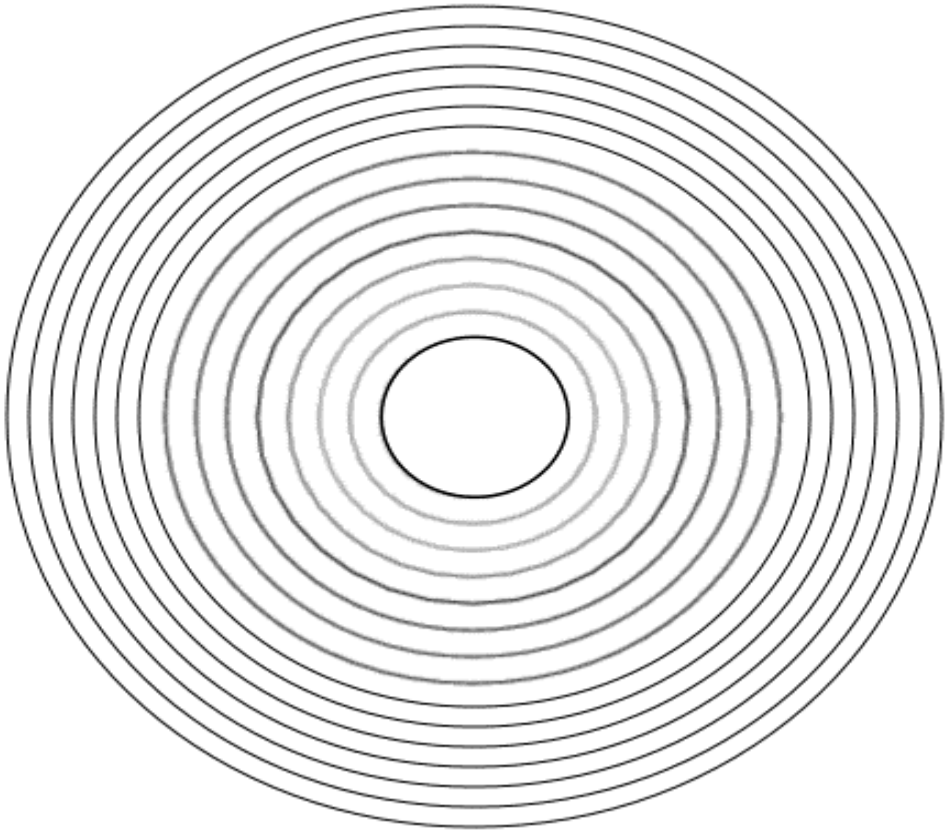
Question 1: You are given a template of the shell structure of the atom. Draw, label, and correctly color code the shell structure of the last element on the periodic table (Og with an atomic number of 118)




Kernel
(Yellow Colored Region)
S subshell
Valence Sheath
(Green Colored
Region
Antepenultimate
Shell
Valence Shell
P subshell
Q
P
O
N
M
L
K
Neutron
Proton
Electron
Note: There are infinite number of empty shells outside of the valence shell; only a few are shown here.
F subshell
Number of electrons
K = 2
L = 2, 6 = 8
M = 2, 6, 10 = 18
N = 2, 6, 10, 14 = 32
O = 2, 6, 10, 14 = 32
P = 2, 6, 10 = 18
Q = 2, 6 = 8
Nucleus
Penultimate
Shell
D subshell

Question 2: You are given a template of the shell structure of the atom. Draw and label, and correctly color code the orbital structure of the last element on the periodic table (Og with an atomic number of 118).



ATOMIC STRUCTURE FOUNDATIONS: Ring Diagram of Shell Structure of a fully filled atom namely, the last element on the Periodic Table, Oganesson, Og, with an atomic number of 118

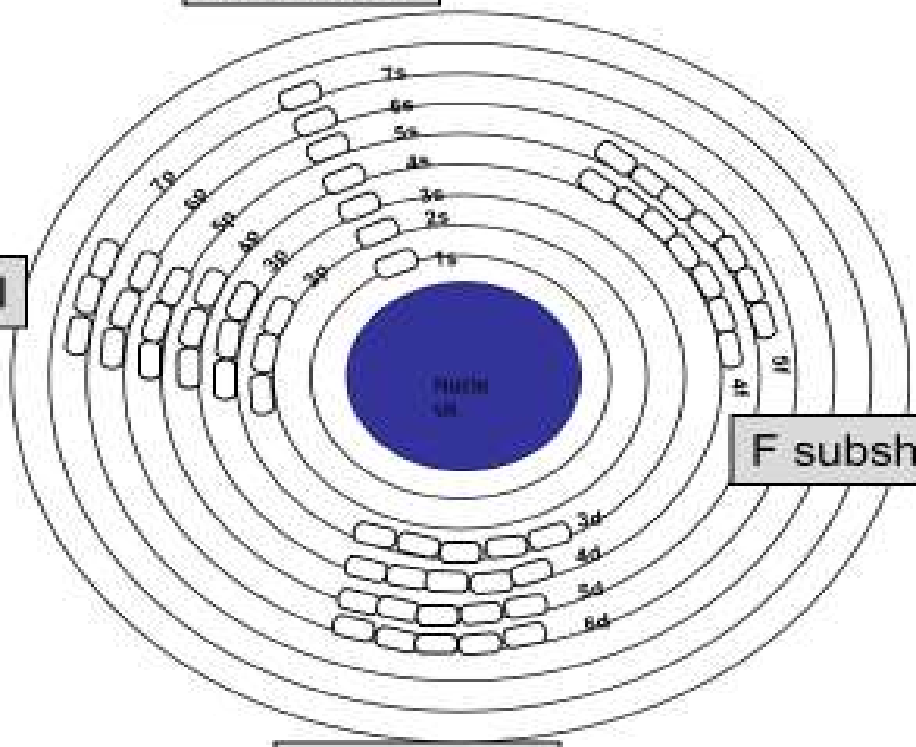
Shell Names
7th-Q Shell
6th-P Shell
5th-O Shell
4th-N Shell
3rd-M Shell
2nd- L Shell
1st- K Shell

S subshell

P subshell

F subshell

D subshell



Note: Upper Case – Lower Case Distinction:
S Subshell has s orbitals.
P Subshell has p orbitals.
D Subshell has d orbitals.
F Subshell has f orbitals.
The number before the lower case letter represents the number of the respective shell.

Every s orbital is a single room. Every p orbital is a set of three rooms. Every d orbital is a set of five rooms. Each f orbital is a set of 7 rooms.

Each room is called a suborbital; Each orbital can hold a maximum of TWO electrons. In p, d, and f orbitals, each room has a specific name.

P orbital: p_x, p_y, p_z

d orbital: d_{xy}, d_{yz}, d_{xz}, $d_{x^2-y^2}$, d_{z^2}

Names of f orbitals are little more complex and are not required for high school chemistry courses.

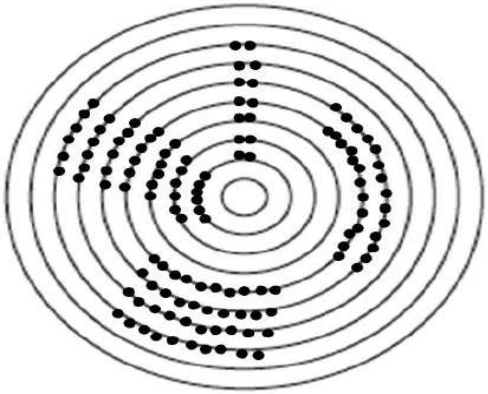
p orbital

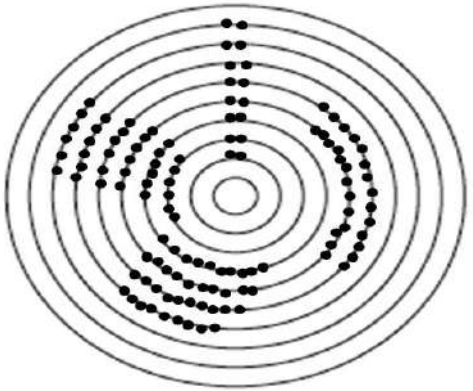
p_x, p_y, p_z

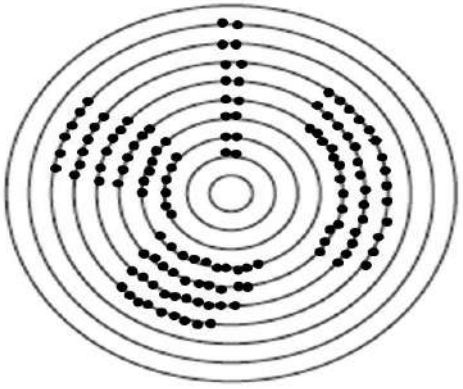
d orbital

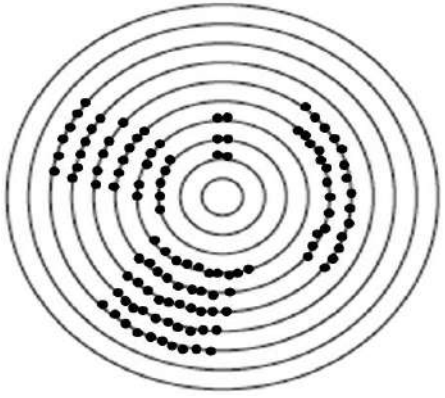
d_{xy}, d_{yz}, d_{xz}, $d_{x^2-y^2}$, d_{z^2}

Question 3. Find and list the errors in any two of the following shell structures of the last element on the periodic

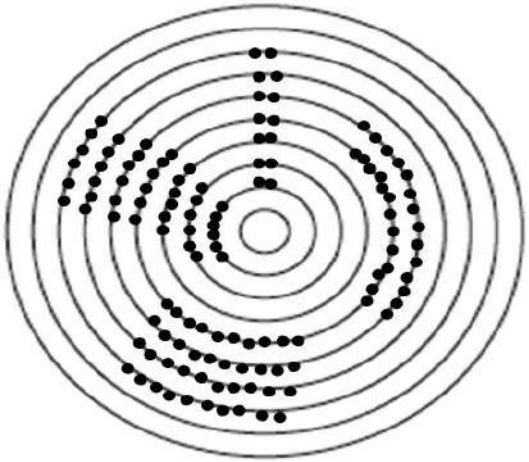








A solved problem is given belo to help you answer the above questions



1p not possible

3d missing

7d not possible

4f: 1 electron missing

Evaluation Rubric

For Question 1 (Total 25 Pts)

1 Pt each for the following (Total 9 Pts)

1. Nucleus
2. Proton
3. Neutron
4. Electron
5. Valence Shell
6. Penultimate shell
7. Antepenultimate shell
8. Kernel
9. Valence Sheath

2 Pt each for the following (Total 10 Pts)

1. Names of First Seven Shells
2. Correct color coding for Valence Sheath

For Question 2 (Total 25 Pts)

1 Pt for the following (Total 1 Pt)
Names of subshells

2 Pt each for the following (Total 16 Pts)

1. Names s orbitals
2. Names of p orbitals
3. Names of d orbitals
4. Names of f orbitals
5. Correct number of boxes for s orbitals
6. Correct number of boxes for p orbitals
7. Correct number of boxes for d orbitals
8. Correct number of boxes for f orbitals

3 Pt for the following (Total 3 Pts)

Names of p suborbitals

For Question 3

Each error correctly identified takes 0.5 Pt