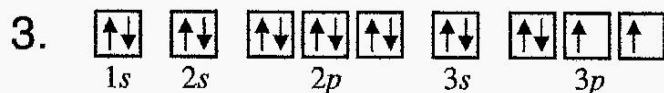
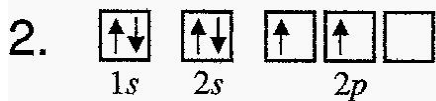


Orbital Diagrams and Electron Configuration

Symbol	Total number of electrons	Orbital Diagram
Mg		
V		
Ge		
Zr		
P		

Directions: Write the name and symbol for the elements with the following orbital diagrams



Directions: There is an error with each one of the following orbital diagrams. Explain the error.

6.



7.



8. Write the electron configuration for the following elements.

a) Sodium _____

b) Barium _____

c) Neptunium _____

9. Write the noble gas configuration for each of the following.

a) Cobalt _____

b) Tellurium _____

c) Lawrencium _____

10. Determine what element is represented by the configuration below.

a) $1s^2 2s^2 2p^6 3s^2 3p^4$ _____

b) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1$ _____

c) [Kr] $5s^2 4d^{10} 5p^3$ _____

d) [Rn] $7s^2 6d^1 5f^{11}$ _____

QUANTUM NUMBERS WORKSHEET

1. State the four quantum numbers, then explain the possible values they may have and what they actually represent.
2. State the number of possible electrons described by the following quantum numbers
 - a. $n = 3, l = 0$
 - b. $n = 3, l = 1$
 - c. $n = 3, l = 2, m_l = -1$
 - d. $n = 5, l = 0, m_l = -2, m_s = -1/2$
3. Give the n and l values for the following orbitals
 - a. $1s$
 - b. $3s$
 - c. $2p$
 - d. $4d$
 - e. $5f$
4. What are the m_l values for the following types of orbitals?
 - a. s
 - b. p
 - c. d
 - d. f
5. How many possible orbitals are there for $n =$
 - a. 2
 - b. 4
6. Write the complete set of quantum numbers that represent the **valence electrons** for the following elements:
 - a. He
 - b. V
 - c. Ni
 - d. Cu
 - e. Br

7. Write the possible quantum numbers for the following.

a) Calcium

b) $n=4$

c) 2p

8. How many electrons can inhabit all of the $n=4$ orbitals?

9. Fill in the blanks with the correct response:

a. The number of orbitals with the quantum numbers $n=3$, $l=2$ and $m_l = 0$ is _____.

b. The subshell with the quantum numbers $n=4$, $l=2$ is _____.

c. The m_l values for a d orbital are _____.

d. The allowed values of l for the shell with $n=2$ are _____.

e. The allowed values of l for the shell with $n=4$ are _____.

f. The number of orbitals in a shell with $n=3$ is _____.

g. The number of orbitals with $n=3$ and $l=1$ is _____.

10. Write the values for the quantum numbers for the following.:

a. 3p orbitals

b. 5s

11. How many electrons can occupy any single subshell orbital? ____

12.

a. What are the possible values of m_l for a 5d electron?

b. What is the maximum number of electrons in the 3rd energy level?

c. . How many electrons have the following quantum numbers: $n=4$, $l=2$, $m_l=-2$?

Quantum: Light and Energy

1. The relationship between wavelength and frequency is _____.
2. What does infrared radiation give off more energy than radiowaves?
3. What color light is emitted when an electron moves from 6th energy level to the 2nd energy level in the hydrogen atom? _____
4. How much energy is emitted if a wave has a frequency of 1.6×10^{11} Hz?
5. What is the frequency of a wave with a wavelength of 1.4×10^{-7} m?
6. Convert 460 nm to meters.
7. Circle the radiation with the longer wavelength for each of the pairs below.
 - a) Blue or violet
 - b) X-ray or ultraviolet
 - c) Microwaves or radio waves
8. What amount of energy is released when an electron falls from $n=6$ to $n=3$?
9. What type of radiation is either emitted for absorbed in the following? Indicate the type and circle whether it is emitted or absorbed.
 - a) $n=4$ to $n=1$ (absorbed/emitted)
 - b) $n=4$ to $n=3$ (absorbed/emitted)
 - c) $n=2$ to $n=3$ (absorbed/emitted)
10. How much energy is found in a wave with a wavelength of 2.1×10^{-6} m?

Periodic Table and Periodic Trends

1. The periodic table is arranged in what order?

2. Fill in the table below.

Element Name	Symbol	Family/Group Name	Valence Electrons	Oxidation Number (Charge)	Metal, non metal, metalloid
Zinc					
Uranium					
Arsenic					
Iodine					

3. Explain why strontium has a larger atomic radius than magnesium.

4. Of the elements listed below which requires the most energy to remove an electron; why?

Oxygen, Nitrogen, Carbon

5. Identify the element found in the **most** reactive metal family.

Ca Fe Th Br K

6. Draw the valence dot diagrams for the following elements.

S He Al

7. Choose the larger particle for each pair.

- a) Calcium or Calcium ion
- b) Fluorine or Fluorine ion
- c) Bromine or Iodine
- d) Iron or Zinc

8. Choose the element that belongs in the family or classification found in parenthesis.

- a) C Si Ar Sb (noble gas)
- b) Al Ge Cl Mg (metalloid)
- c) K Li U H (non-metal)
- d) Ca Ni B I (alkaline earth metal)

9. Use these elements to answer the questions below S, Cl, Al, Na

- a) Increasing ionization energy
- b) decreasing electronegativity