

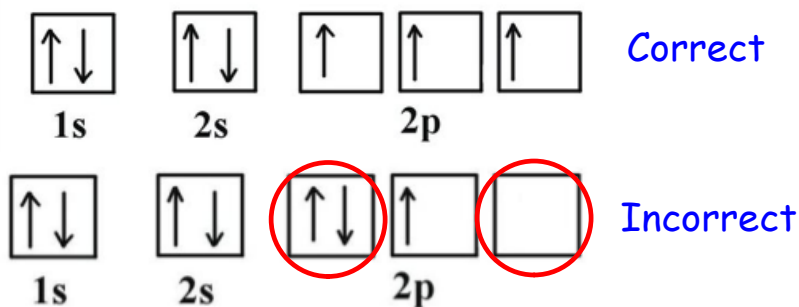
Rules for filling Orbital Diagrams

Hund's Rule

When filling sublevels other than s, electrons are placed in individual orbitals before they are paired up.

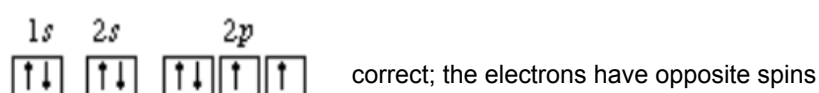
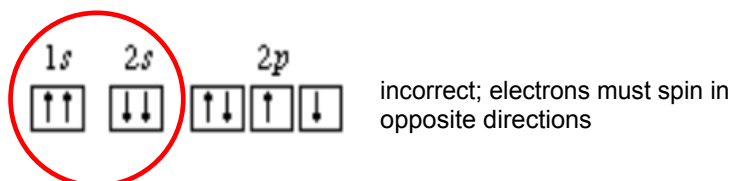
Electrons fill like people do on a bus. You would never sit right next to someone you did not know if there are free seats available, unless of course all the seats are taken then you must pair up.

Nitrogen



Pauli Exclusion Principle

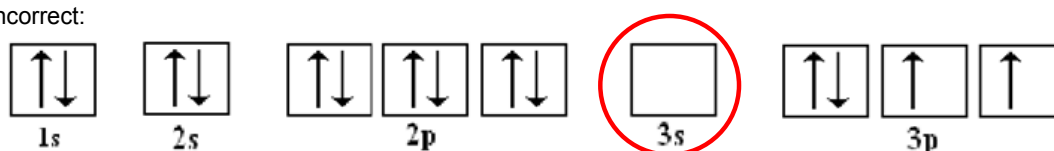
An orbital can hold 0, 1, or 2 electrons only, and if there are two electrons in the orbital, they must have opposite (paired) spins.



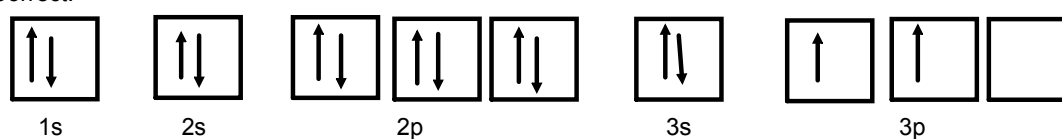
Aufbau Principle

electrons will first occupy orbitals of the lowest energy level

Incorrect:



Correct:



Electron Configurations

Name _____

PART A – ORBITAL DIAGRAMS & LONGHAND ELECTRON CONFIGURATION
 Use the patterns within the periodic table to draw orbital diagrams for the atoms of the following elements.

	1s	2s	2p	3s	3p	4s	3d	4p	5s
H	↑								
Li	↑↓	↑							
C	↑↓	↑↓	↑ ↑						
Ne	↑↓	↑↓	↑↓ ↑↓						
Na	↑↓	↑↓	↑↓ ↑↓	↑					
Mg	↑↓	↑↓	↑↓ ↑↓	↑↓					
Al	↑↓	↑↓	↑↓ ↑↓	↑↓	↑				
P	↑↓	↑↓	↑↓ ↑↓	↑↓	↑ ↑				


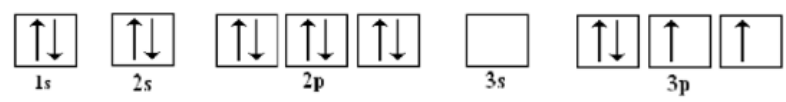
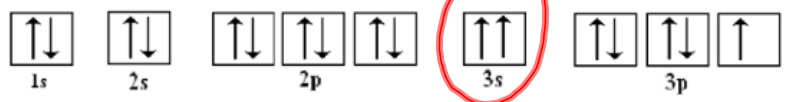
S	↑↓	↑↓	↑↓ ↑↓	↑↓	↑ ↓				
Cl	↑↓	↑↓	↑↓ ↑↓	↑↓	↑ ↓ ↑				
K	↑↓	↑↓	↑↓ ↑↓	↑↓	↑ ↓ ↑	↑			
Cr	↑↓	↑↓	↑↓ ↑↓	↑ ↓	↑ ↓ ↑ ↓	↑ ↓ ↑ ↑			
Fe	↑↓	↑↓	↑↓ ↑↓	↑ ↓	↑ ↓ ↑ ↓	↑ ↓ ↑ ↑ ↑			
Co	↑↓	↑↓	↑↓ ↑↓	↑ ↓	↑ ↓ ↑ ↓	↑ ↓ ↑ ↑ ↑			
Zn	↑↓	↑↓	↑↓ ↑↓	↑ ↓	↑ ↓ ↑ ↓	↑ ↓ ↑ ↓ ↑ ↓			
Ge	↑↓	↑↓	↑↓ ↑↓	↑ ↓	↑ ↓ ↑ ↓	↑ ↓ ↑ ↓ ↑ ↓	↑ ↓		
Se	↑↓	↑↓	↑↓ ↑↓	↑ ↓	↑ ↓ ↑ ↓	↑ ↓ ↑ ↓ ↑ ↓	↑ ↓	↑ ↓	
Kr	↑↓	↑↓	↑↓ ↑↓	↑ ↓	↑ ↓ ↑ ↓	↑ ↓ ↑ ↓ ↑ ↓	↑ ↓ ↑ ↓	↑ ↓	↑ ↓

Questions:

1. Which element contains a full second energy level? *Ne*
2. Name one element that contains 3 unpaired electrons in its 3rd energy level. *P*
3. Name one element that contains 5 total electrons in its 3d orbital. *Mn*

PART B – RULES OF ELECTRON CONFIGURATIONS

Which of the following rules are being violated (Hund, Pauli, or Aufbau) in the electron configurations below? Explain your answer for each.

1.  *Hund*
2.  *Aufbau*
3.  *Pauli*