

Name: Key

Date: \_\_\_\_\_

Pd: \_\_\_\_\_

### Orbital Diagrams and Electron Configuration - Honors

1. Compare the energy of an electron in the ground state and an electron in the excited state.

↓  
Lower higher

2. When an electron falls from a higher energy level to a lower energy level, how is the energy released?

photon of electromagnetic radiation

3. The further the electron is from the nucleus, the higher energy the electron has.

4. A(n) orbital is often thought of as a region of space in which there is a high probability of finding an electron.

8. How is the s sublevel different from the p sublevel? Shape + s = 1orbital, p = 3

9. How many **electrons** can each of the following **sublevels** hold?

a. 2s = 2      d. 6d = 10

b. 3p = 6      e. 4p = 6

c. 5f = 14      f. 3d = 10

10. How many "p" orbitals can there be in any energy level? 3

11. What is the **maximum** number of electrons in the 3<sup>rd</sup> energy level? 18

12. How many **orbitals** are in each of the following **sublevels**??

a. 4p sublevel 3      c. 4f sublevel 7

b. 3d sublevel 5      d. 2s sublevel 1

### Orbital Diagrams

1. Which elements are represented the following orbital diagrams?

	1s	2s	2p	3s	3p	4s	3d	Element (answer)
a	↑↓	↑↓	↑↑↑					N
b	↑↓	↑↓	↑↓↑	↑↓	↑↓↑	↑↓	↑	Sc
c	↑↓	↑↓	↑↑↑	↑↓	↑↑			S

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2. Fill in the electron configurations for the elements given in the table. Use the orbital diagrams to complete the table.

Electron Configurations for Some Selected Elements							
Element	Orbital filling						Electron configuration
	1s	2s	2p	2p	2p	3s	
H	↑	□	□	□	□	□	1s <sup>1</sup>
He	↑↓	□	□	□	□	□	1s <sup>2</sup>
Li	↑↓	↑	□	□	□	□	1s <sup>2</sup> 2s <sup>1</sup>
C	↑↓	↑↓	↑	↑	□	□	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>2</sup>
N	↑↓	↑↓	↑	↑	↑	□	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>3</sup>
O	↑↓	↑↓	↑↓	↑	↑	□	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>4</sup>
F	↑↓	↑↓	↑↓	↑↓	↑	□	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>5</sup>
Ne	↑↓	↑↓	↑↓	↑↓	↑↓	□	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup>
Na	↑↓	↑↓	↑↓	↑↓	↑↓	↑	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>1</sup>

3. Using arrows, show how the following orbitals will fill with electrons.

	Electron Configuration	1s	2s	2p			3s	3p			4s	3d			
Mg	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>2</sup>	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓								
Cl	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>2</sup> 3p <sup>5</sup>	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑					
Si	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>2</sup> 3p <sup>2</sup>	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑	↑						
Ti	1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>6</sup> 3s <sup>2</sup> 3p <sup>6</sup> 4s <sup>2</sup> 3d <sup>2</sup>	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑↓	↑	↑		

4. Draw the <sup>e-</sup> Config orbital diagrams for the following ions:

