Electron Configuration Practice Worksheet

In the space below, write the full (unabbreviated) electron configurations of the following elements:

1. sodium   _____

2. iron   _____

3. bromine   _____

4. barium   _____

Determine what elements are denoted by the following electron configurations:

5. $1s^2 2s^2 2p^6 3s^2 3p^4$ _____

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

7. $1s^2\ 2s^2 2p^6\ 3s^2 3p^6\ 4s^2\ 3d^{10}\ 4p^4$ _____

8. $1s^2\ 2s^2 2p^6\ 3s^2 3p^6\ 4s^2\ 3d^{10}\ 4p^5$ _____

9. $1s^2\ 2s^2 2p^6\ 3s^2 3p^6\ 4s^2\ 3d^{10}\ 4p^6$ _____

Table:

Element	Orbital Filling Diagram Electron Configuration
a. Boron	
b. Silicon	
c. Sulfur	
d. Calcium	
e. Iodine	

4. Explain why the following ground-state electron configurations are not possible:

    a. $1s^2 2s^3 2p^3$

_____

_____

_____

    b. $1s^2 2s^2 2p^3 3s^6$

_____

_____

_____

    c. $1s^2 2s^2 2p^7 3s^2 3p^8$

_____

_____

_____

    d. $1s^2 2s^2 2p^6 3s^2 3p^1 4s^2 3d^{14}$

_____

_____

_____

Identify the element:

$3, 1, -1, + \frac{1}{2}$ _____

$4, 3, +3, - \frac{1}{2}$ _____

$4, 2, +1, + \frac{1}{2}$ _____

$2, 1, +1, - \frac{1}{2}$ _____

$6, 1, 0, - \frac{1}{2}$ _____

Label each of the following sets of four quantum numbers as either Valid, which indicates that set is a legitimate set of quantum numbers for an electron, or Invalid, which would indicate that the set is not a possible set of quantum numbers for an electron. *(Hint: Check them with the rules on the quantum numbers handout you got)*

n	ℓ	m_ℓ	m_s	Valid or Invalid?
1	0	0	½	
1	1	+1	-½	
2	0	0	-½	
2	2	-2	½	
2	1	-1	½	
3	2	-1	½	
3	1	0	0	
3	0	1	½	
3	0	0	-½	
1	2	-3	½	

Which of the following represents a permissible set of quantum numbers? (answer "yes" if permissible and "no" if no permissible)

2, 2, +1, -1/2 _____

7, 0, 0, -1/2 _____

5, 1, 0, +1/2 _____

4, 1, 8, +1/2 _____

6, 3,-2, +1/2 _____

Write the four quantum numbers which describe the location of the highest energy electron of the following:

N _____

Ni _____

Xe _____

Br _____

Use the periodic table to find the numbers of protons, neutrons, and electrons for atoms of the following elements.

Name of Element	Element Symbol	Mass Number	Atomic Number	Protons	Neutrons	Electrons
Sodium		24	11			
Copper			29		35	
	H				0	
Carbon		12				
	N			7		
	Ba					56
Calcium						
	Mg			12		12
	^{16}C					
Iron-58						