Revised August 2012

HONORS WORKSHEET 7a: Quantum Numbers

1. Write three **possible sets** of quantum numbers for the highest energy electrons in the aluminum atom. (3)

	n	l	m	s
Electron # 11				
Electron # 12				
Electron # 13				

2. Which atomic theory is violated by the following sets of quantum numbers representing beryllium's outer shell electrons? Explain your answer. (2)

n	l	m	s
2	0	0	+ ½
2	0	0	+ ½

_____

_____

_____

_____

3. The 'f' orbitals have an azimuthal quantum number, l = 3. How many 'f' orbitals are there, and what are the possible values for their m quantum numbers?

4. List the possible m values for the following types of orbitals.

   (a) s orbitals

   (b) p orbitals

   (c) d orbitals

5. Name the orbitals described by the following quantum numbers

   (a) n = 3, l = 0

   (b) n = 3, l = 2

   (c) n = 5, l = 0

6. Give the n and l values for the following orbitals

   (a) 1s

   (b) 3s

   (c) 2p

   (d) 5f

7. Which quantum numbers are associated with each of the following?

   (a) The fourth energy level.

   (b) The 4s sub-level.

   (c) The first electron in the 4f sub-level.

8. What is the maximum number of electrons that can have the following quantum numbers associated with them?

   (a) n = 6

   (b) n = 3, l = 1

   (c) n = 4, l = 2, m = 2

   (d) n = 4, l = 0, m = 0, s = +½