Orbitals and Quantum Numbers
Practice Questions

1. What are the shapes of s, p, and d orbitals respectively?

s= spherical p = dumbbell d = cloverleaf

2. How many 1s orbitals are there in an atom? 4p orbitals? 4d orbitals?

1s: 1 4p: 3 4d: 5

3. What is the maximum number of orbitals with:

n = 4	**l = 1**		**3 (the 4p orbitals)**
n = 2	**l = 2**		**none (l must be < n)**
n = 3	**l = 2**		**5 (the 3d orbitals)**
n = 5	**l = 1**	**m_l = -1**	**1 (3 q.n. define a unique orbital)**

4. Which orbitals cannot exist?

2p 3p 4d 3f 6s 2d

3f and 2d

5. Write a set of quantum numbers for a 4f orbital.

n = 4 l = 3 m_l = 3, 2, 1, 0, -1, -2, -3

6. Describe the electrons defined by the following quantum numbers:

n	l	m_l	
3	0	0	3s electron or orbital
2	1	1	2p electron or orbital
4	2	-1	4d electron or orbital
3	3	2	not allowed (l must be < n)
3	1	2	not allowed (m_l must be between -l and l)