BMEN 343 **NAME (PRINT)**_____

HOMEWORK #1 (60 PTS) **SIGNATURE:**_____

DUE: 11 September 2009 at the BEGINNING OF CLASS:

- There are 3 pages to this homework. Answers should be given neatly, in order, and in the space provided – may be continued on the back if needed. Show work for full credit. Put the final answer in a box when appropriate.

True or False: (Circle T or F)

1. **(2 pt)**	T	F	Before being filled with electrons, the 3d subshell is lower in energy than the 4s subshell.
2. **(2 pt)**	T	F	Orbitals with same "n" belong to same shell.
3. **(2 pt)**	T	F	A B (boron) atom is more electronegative than an O (oxygen) atom.
4. **(2 pt)**	T	F	A Fe (iron) atom is smaller than a Ti (titanium) atom.
5. **(2 pt)**	T	F	The angular quantum number designates orbital shape.
6. **(2 pt)**	T	F	For polar molecules, permanent dipoles exist.
7. **(2 pt)**	T	F	The number of atoms in 1 BCC unit cell is 4.

Brief Answer

1. **(11 pts)** What is the electronic configuration of Co^{3+} ? (Show how you derived your answer using an orbital diagram; do not use any abbreviations such as [Ar]) **(4 pt)** What is the valence electronic configuration? **(4 pt)** What is the valence shell (K, L, etc)? **(3 pt)**

2. **(11 pts)** What is the electronic configuration of Ti^{3+} ? (Show how you derived your answer using an orbital diagram; do not use any abbreviations such as [Ar]) **(4 pt)** What is the valence electronic configuration? **(4 pt)** What is the valence shell (K, L, etc)? **(3 pt)**

3. **(8 pts)** What is the electronic configuration of O^{2-}? (*Show* how you derived your answer using an *orbital diagram*) **(3 pt)** What is the valence electronic configuration? **(3 pt)** O^{2-} has the same electronic configuration as what neutral atom? **(2 pt)**

4. **(4 pts)** Briefly describe London (dispersion) forces *including* their origin (i.e. why they occur).

5. **(6 pts)** Calculate the volume of unit cell of nickel (Ni) in cubic meters. Refer to Table 3.1 in your book.

6. **(6 pts)** Calculate the theoretical density (g/cm^3) of tungsten (W). Refer to Table 3.1 in your book.