1. What electronic states can you derive from the following configurations? Give the term symbols, specifying the angular momentum (L) and spin multiplicity.

   a) $1s^22p$  
   b) $1s^22s^2(2p)^2$  
   c) $1s^22s^22p^3p$  
   d) $1s^22p3d$  
   e) $1s^22s3s3p$

   In each case, indicate which state is the lowest in energy.

2. For each of the following indicate what J states are possible (i.e., complete the term symbols).

   a) P  
   b) $^2D$  
   d) $^4S$  
   d) $^2P$  
   c) $^1F$

3. Calculate the $2s \rightarrow 3p$ transition energy of He$^+$. 