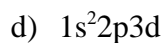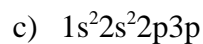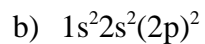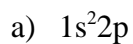**Due: October 7, 1999**

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

   a) $1s^2 2p$ b) $1s^2 2s^2 (2p)^2$ c) $1s^2 2s^2 2p 3p$

   d) $1s^2 2p 3d$ e) $1s^2 2s 3s 3p$
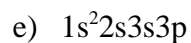
   In each case, indicate which state is the lowest in energy.

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^+.