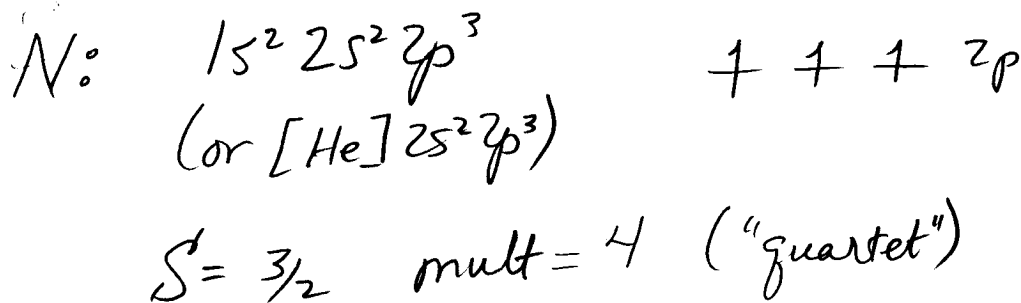
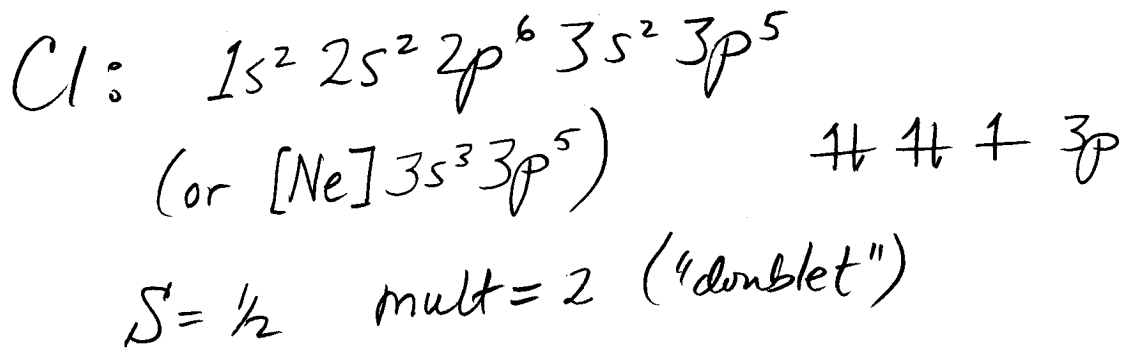


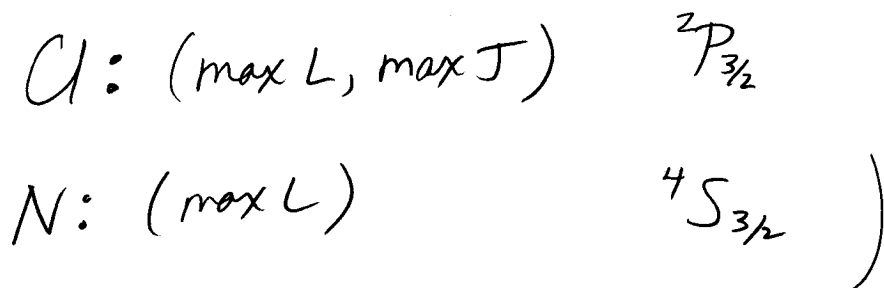
Quiz #4

Name: KEY

1. Write the electron configurations and predict the spin multiplicity for the ground-states of: Cl ($Z=17$) and N ($Z=7$). If they are not singlets, draw a diagram for the outer shell to justify your answers.



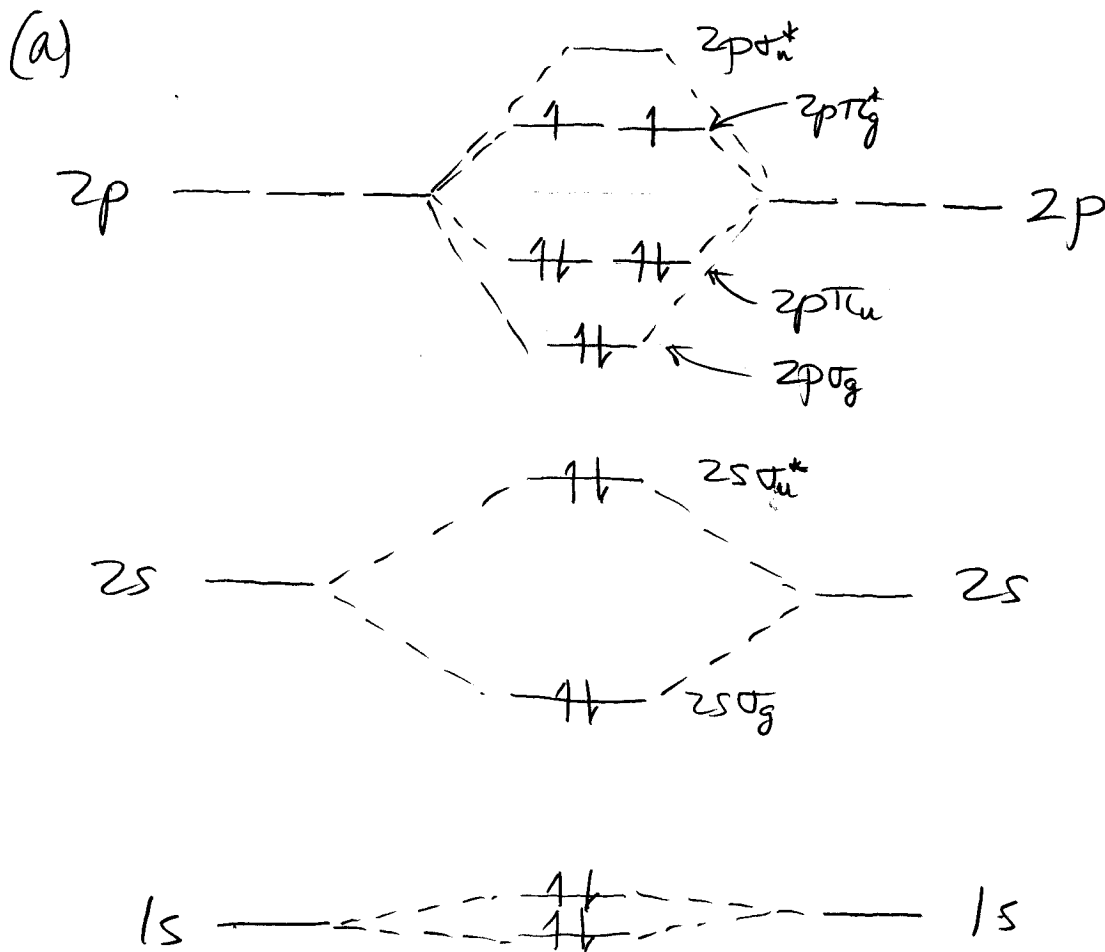
(Aside: What are the term symbols for the ground state?)



2. Recall that the energy ordering of molecular orbitals appropriate to O_2 is:

$$2p\sigma < 2p\pi < 2p\pi^* < 2p\sigma^*$$

- Sketch the energy diagram illustrating how these molecular orbitals result from mixing the atomic orbitals of O ($Z=8$).
- What is the bond order of O_2 ?
- Do you expect O_2^- to be more or less stable than O_2 . Explain.



(b) there are 5 pairs of electrons in bonding orbitals and 3 pairs in antibonding orbitals so the bond order is $5-3 = 2$

(c) O_2^- would be less stable because the added e goes into an antibonding orbital ($2p\pi_g^*$)