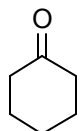


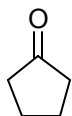
Section Problem Set

Orbitals and Bonding

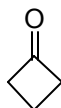
Problem 1 (data provided in Loudon, 4 ed., p. 845). Provide an explanation for the following observed trend for the IR absorptions corresponding to C=O stretching in these cyclic ketones.



cyclohexanone
1715 cm^{-1}



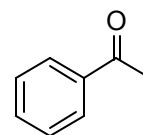
cyclopentanone
1745 cm^{-1}



cyclobutanone
1780 cm^{-1}



cyclopropanone
1850 cm^{-1}



acetophenone
1685 cm^{-1}

Problem 2. Note that the following substitution reactions proceed with retention of configuration despite being conducted under standard S_N2 conditions. Provide an explanation for this observation, being sure to touch on molecular orbital theory.

