



The C=O stretching frequencies (top down) are 1714, 1746, and 1783 cm⁻¹.

The C=C stretching frequencies (top down) are 1649, 1656, and 1677 cm⁻¹.

Thus: In both series the frequency increases as the ring size is reduced. Explain this observation using your knowledge of Valence Bond theory (hybridizations!!). Also explain why the C=O frequencies are higher than the C=C frequencies. (Consider both the force constant and the reduced mass!)

(Spectra from Lambert *et al.*)