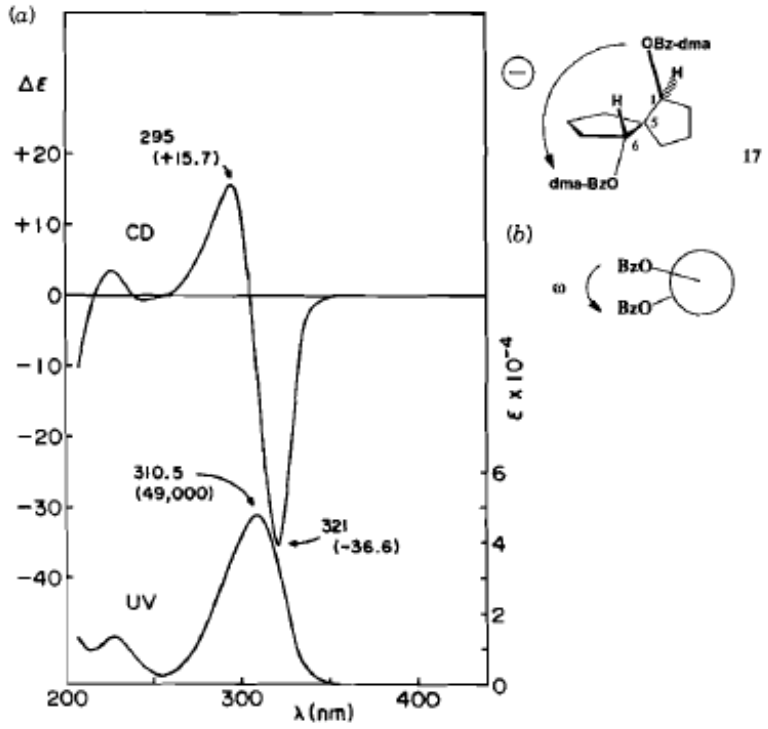
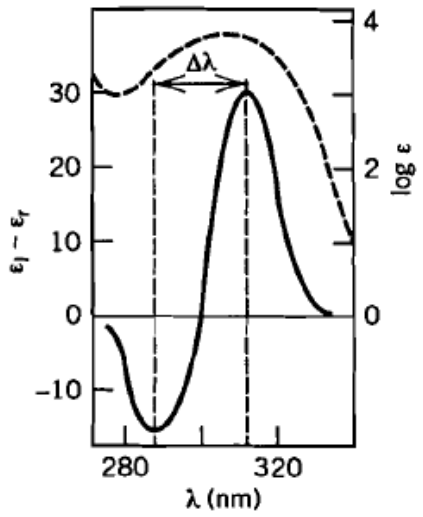
What is exciton chirality? Explain with diagram, what is Davydov splitting.

When two chromophores are in close spatial proximity to one another and so disposed that a chiral array results, interaction (dynamic coupling) between the individual chromophores gives rise to characteristic CE couplets, in the CD spectrum. This is known as exciton coupling or exciton chirality. From this the configuration of the chiral array may be easily deduced.

For example, this method is used for determining the configuration of glycols from the sign of the CE of the strong p-p* transition of the glycol dibenzoate derivatives (You can give the graph and Δε vs λ scale values only approximately, no need to give the inside values)



In this exciton coupled spectra the difference between the wavelength of minima and maxima is known as Davydov splitting as shown below.



The benzoate ester of a given 2-octanol shows negative Cotton effect (-) CE. Applying the benzoate sector rule, find out its absolute configuration.

The benzoate ester is prepared with the given 2-octanol and the Cotton effect is determined. It is given that the CE is negative. According to benzoate sector rule we have to look the molecule from the plane of benzene ring. Now it is divided into 8 sectors (as shown below). Then the large group is placed anti periplanar with respect to C=O. If the medium group goes to negative sector, then it will show negative CE. So, following this rule if we do a retro analysis, we can find that when the CE is negative the absolute configuration of the 2-octanol is (R).