

Poor intensity :-

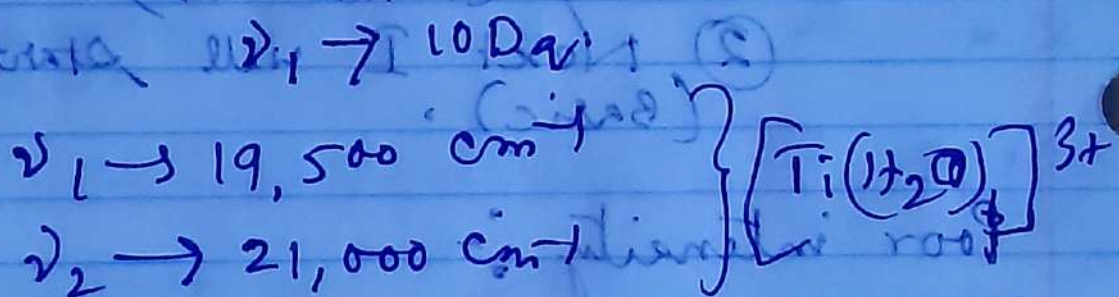
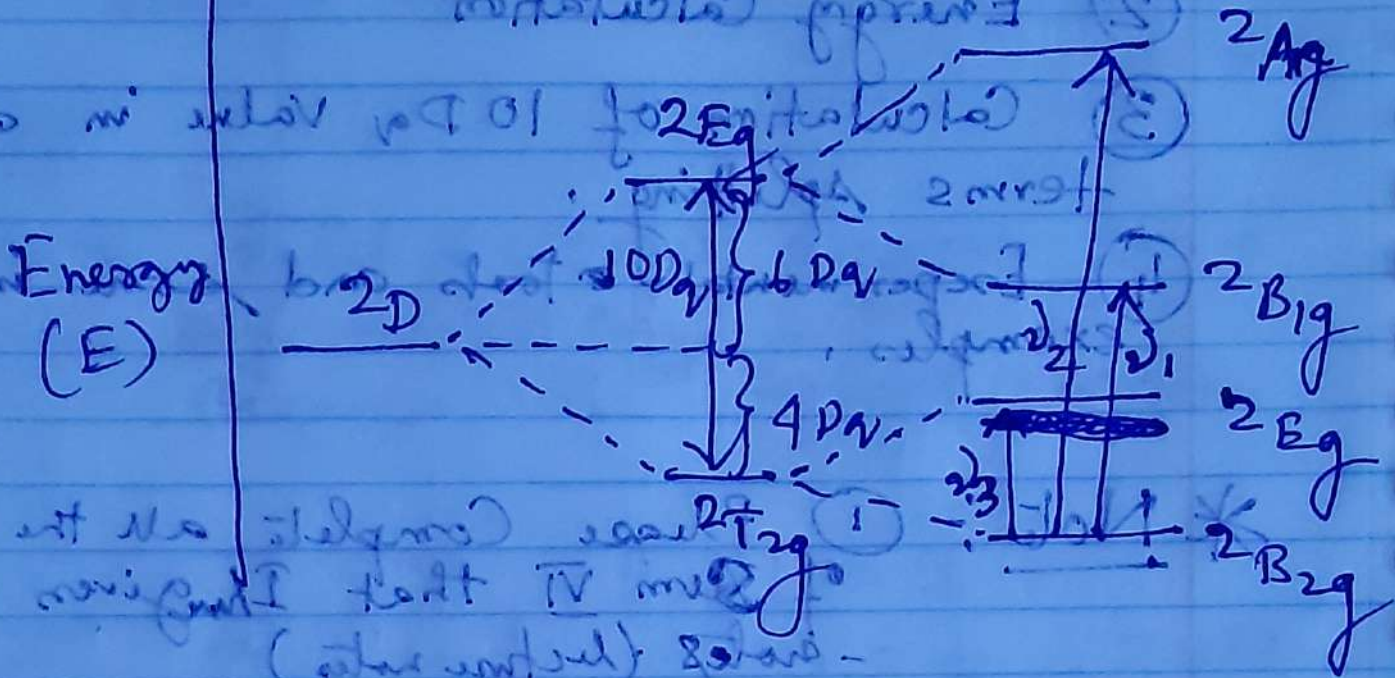
The poor intensity of the peak is due to the Laporte forbidden d-d forbidden transition. In some cases, it is partially allowed due to vibronic coupling.

Band width :-

The unsymmetric band and broad nature of the peak suggest that it consists of two overlapping peaks. It takes place due to the splitting of  $2E_g$  state. (Jahn Teller effect).



# Considering Z-out J-T



But, without J-T distortion, a single peak will appear. Here due to J-T distortion the lowering of symmetry from  $O_h$  to  $D_{4h}$  occurs.

Here it is important to mention that  $\nu_1$  &  $\nu_2$  are closely separated that is why we get a broad and asymmetric peak. But if  $\nu_1$  &  $\nu_2$  are widely separated then we get two distinct peaks.