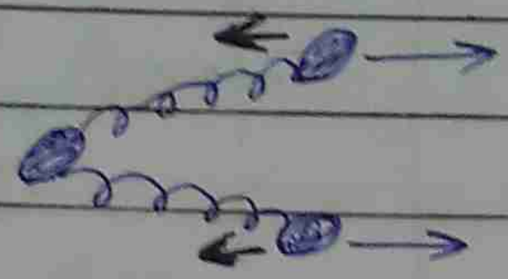
Molecular vibration in I.R.

:- Two types.

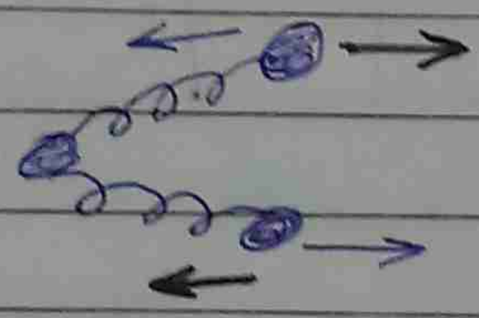
① Stretching vibrations:-
Changes in ~~bond~~ bound length

(a) Symmetrical vibration :-



movements of atoms with respect to central atom in the same direction

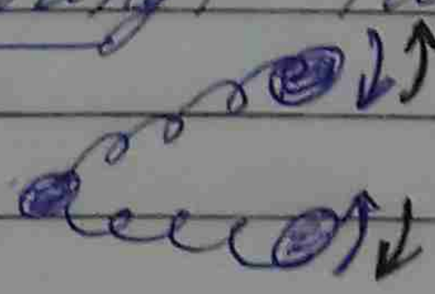
(b) Asymmetrical vibration :-



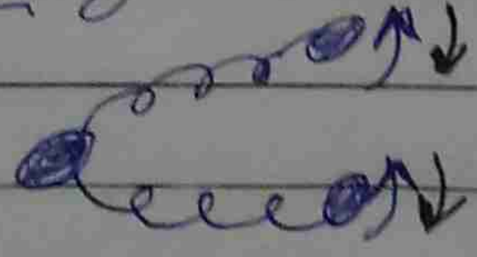
Movement of atoms with respect to central atom in the opposite directions.

② Bending vibrations :-
Changes in bound Angles

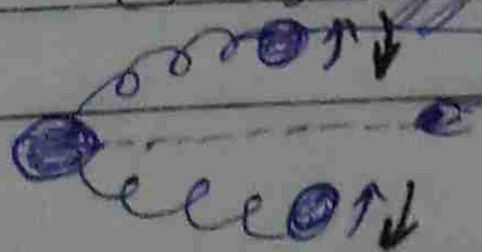
(a) Scissoring :- Two atoms moves to each other



(b) Rocking :- moves in same direction.



(c) wagging :- both atom move up & down in plane of the central atom.



(d) Twisting : one atom is moving up and other atom is moving down the plane ~~the~~ of central atom.

⇒ Factors affecting vibrational frequency :

(I) Inductive effect

(II) Fermi resonance

(III) mesomeric effect

(IV) Field effect.