Q. How can the VSEPR Theory be used to Predict the shapes of molecules?

Ans. The strength of the repulsion between a lone pair and a bond pair of electrons lies in between the repulsion between two lone pairs and between two bond pairs. The order of repulsion between two ~~bond pairs~~ electron pairs as follows:

lone pair - lone pair > lone pair - bond pair > bond pair - bond pair

1) Total No. of electron pairs, around the central atom

$= \frac{1}{2}$ (no. of valence electron of central atom + no. of atom linked to central atom by single bonds.

a) For negative ions add the no. of electrons equal to the unit of negative charge on the ions to the valence electrons of the central atom.

b) For positive ions subtract the no. of electrons equal to the units of positive charge on the ion from the valence electrons of the central atom.

2) The No. of Bond pair = Total no. of atoms linked to central atom by single bond

3. No. of lone pair = Total no. of electron pair around the central atom - No. of shared pair

c) The shape of a molecule with only two atom is always linear.

b) Molecule with three or more atoms one of the atom is called central atom and other atom attached to central atom.

c) If the central atom is linked to similar atoms and is surrounded by bond pairs of electrons only, repulsions between them are similar as a result the shape of the molecule is said to have regular geometry.

d) If the central atom is linked to different atom or is surrounded by bond pair as well as lone pair of electrons. repulsion between them is similar. As a result the shape of the molecule has an irregular or distorted geometry.

e) The exact shape of the molecule depends upon the total no. of electron pairs present around the central atom.

Q. What is the shape & structure of I_3^- according to VSEPR Theory?

Total No. of electron pair around the central atom $= \frac{1}{2}(7+1+2) = \frac{1}{2} \times 10 = 5$

The No. of bond pair $= 2$

No. of lone pair $= 5-2 = 3$

VSEP No $= 5$, shape Trigonal bipyramidal with three lone pair at equitorial position. Thus I_3^- have linear arrangement.