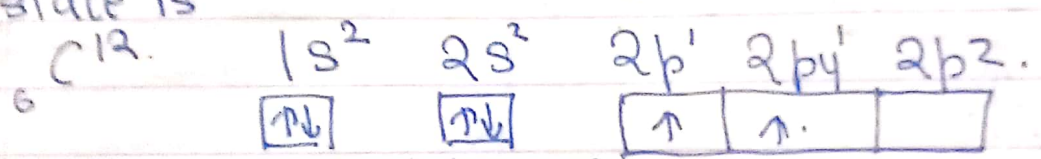
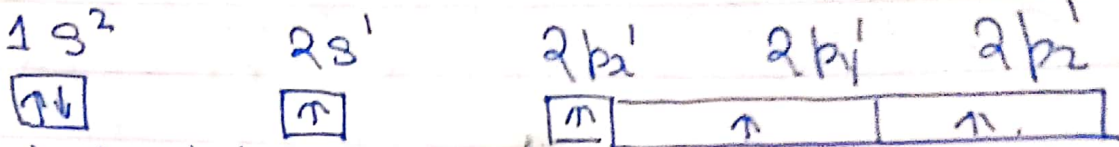
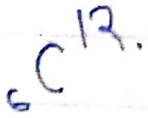


The electronic configuration of carbon in ground state is



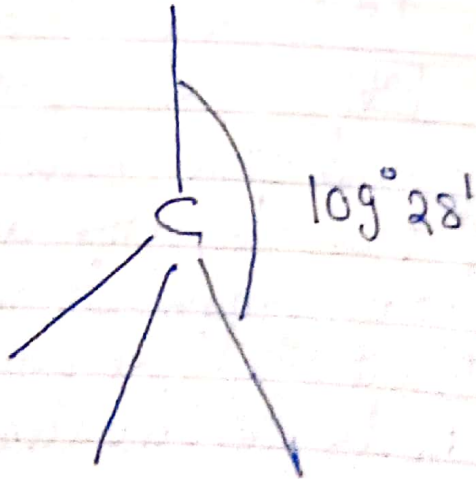
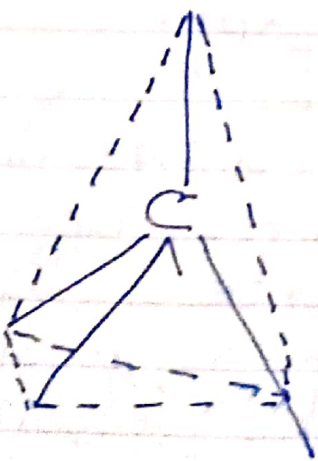
In ground state, electronic configuration of carbon has only two electrons are unpaired and hence carbon must form compounds in valency two. But it is established fact that carbon form all organic compounds in its tetravalence state. Tetravalency of carbon is explained on the suggestion that the paired electrons of $2s$ orbital becomes up unpaired before reaction and its electron is promoted to vacant $2p_z$ orbital. This situation.

is possible. when carbon. will be excited. The electronic configuration. of carbon in excited state.



In excited state carbon. has 4 unpaired electrons and so formed 4 bonds.

According to Le Bel. and Vant Hoff (1876) "the four covalent bond of carbon are not situated in the plane but are symmetrically distributed in space. The four bonds of carbon. are directed towards the four corners of a regular tetrahedron. constructed around the carbon atom. as the centre. The bond angle. of any two bonds. of carbon is $109^\circ 28'$."

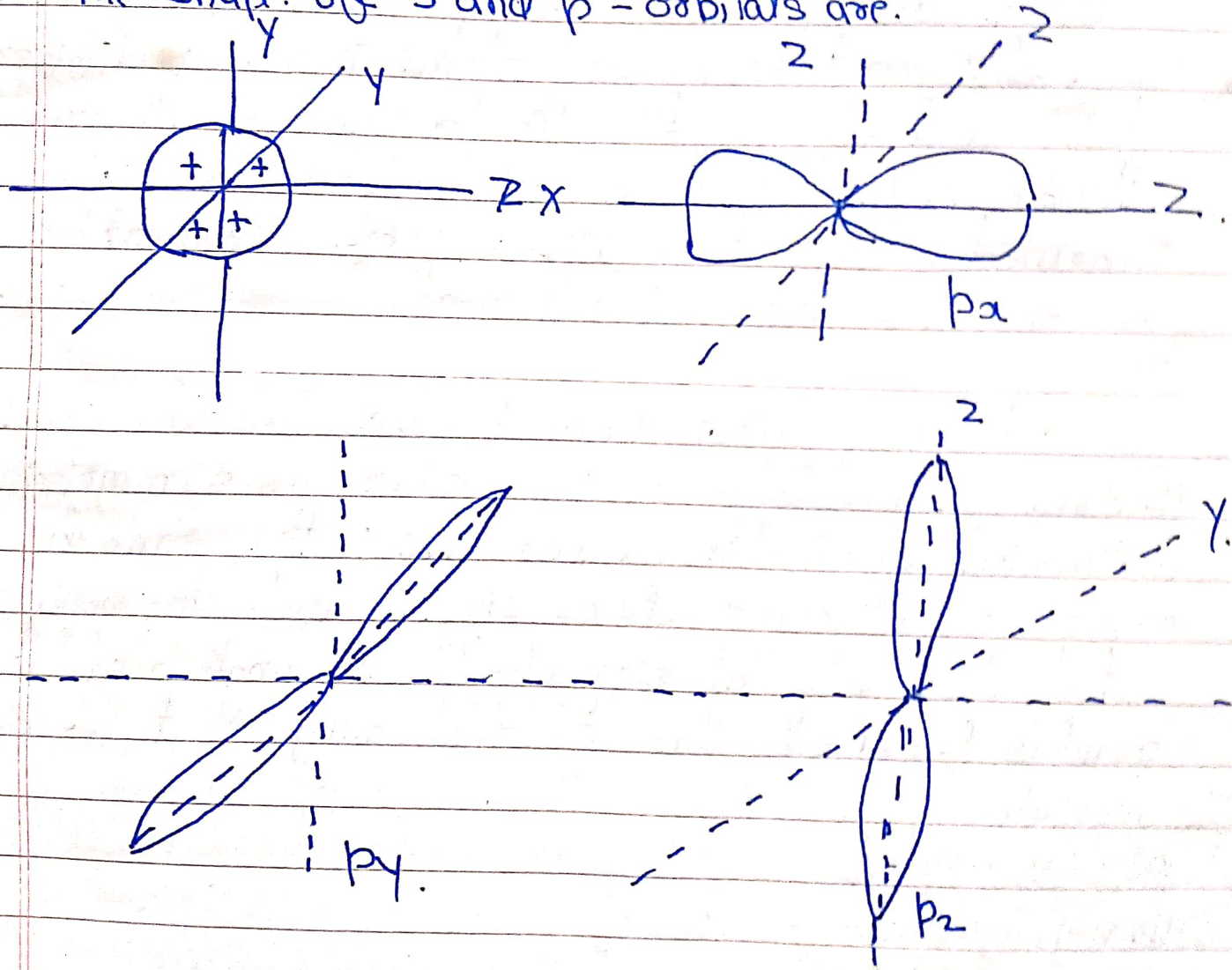


Normal direction. of carbon bond.

Atomic orbitals: The maximum. probability of finding

an electron. in a three dimensional space around the nucleus of an atom is called atomic orbitals or simply orbitals. s, p, d and f are called atomic orbitals. in which the maximum number of 2, 6, 10 and 14 electrons can be accumulated and have 1, 3, 5 and sub-orbitals.

The shape of s and p-orbitals are.



(The orientation of s and p orbitals).

A covalent bond is formed as a result of overlapping of atomic orbitals of the combining

atoms. giving a molecular orbitals.

Thus a covalent bond formation may involve the following types of overlap:-

(i) s-s overlap. (s and s overlap)

(ii) s-p overlap. (s and p overlap)

(iii) p-p overlap (linear or side on)

Each one of these overlap result in the formation of a different molecular orbital having a different shape and energy. In the process of overlap, two main types of molecular orbitals are

formed. Thus two types of covalent bond are formed. Thus two types of covalent bond are formed. Thus two types of covalent bond are formed.

(i) sigma σ bond (ii) Pi π bond.