Class-XI

THE P-BLOCK ELEMENTS

GENERAL INTRODUCTION

✤ TETRAVALENCY OF C-ATOM CHARACTERISTICS OF C-ATOM

(a) **Tetra Valency**: Atomic number of carbon atom is 6 and it have four valency electrons so C -Atom is tetravalent. It is explained by promotion rule.



Available for bond formation

In ground state (here covalency of carbon is 2) First excited state (here covalency of carbon is 4)

- (b) Tendency to form multiple bonds: Carbon atom forms following type of bonds, such as.
- (c) Tetrahedral shape: The four covalent bonds are directed towards the four corners of a regular tetrahedron Bond angle 109°28' or 109.5'



(d) **Catenation**: Self linking property of C-atom is known as catenation. It is responsible for the variety and large number of organic compounds. It may also give rise to open chain and closed chain nature of compounds. Bond energy for catenation of C is maximum.

Bond energy in Kcal:	C – C	Si – Si	N – N	P – P
	85	54	39	50

(e) Hybridisation: The orbitals of different shape but almost of equal energies blend up to give the same number of new orbitals of another shape and of identical energies.

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Chemistry

Structure	σ&π bonds	Hybridization	Bond angle	Shape
-ç-	4, 0	sp ³	109°28'	Tetrahedral
-C =	3, 1	sp ²	120°	Planar (Trigonal)
=C≡	2, 2	sp	180°	Linear
=C=	2, 2	sp	180°	Linear

 σ - (sigma) bonds: The molecular orbital formed by the overlapping of two-s atomic orbitals or one s and one p atomic orbitals or co-axial overlapping of p-orbitals is called a σ bond.



 π (Pi) bonds: π bond is formed by the lateral overlapping of two p-atomic orbitals. It is weaker than σ bond, as there is only partial overlapping.





(Orbital diagram of methane, ethane, ethene and ethyne)