

BONDING & GENERAL CONCEPTS 1.

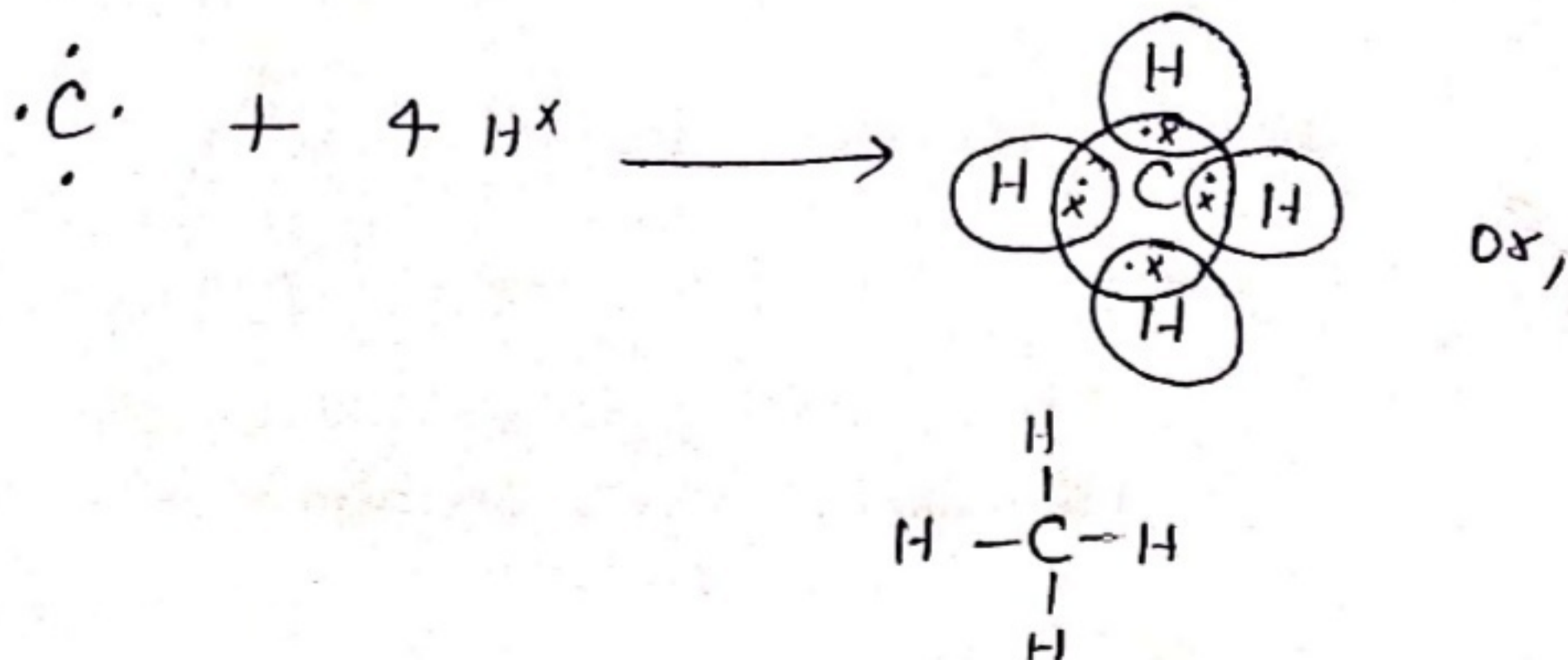
DEGREE-I (H), 16/12/2020

PAPER-II, GROUP-B, CHAPTER-1

LECTURE-9, SESSION 2020-23

VALENCE OF CARBON

- * The atomic number of carbon = 6
Atomic weight of carbon = 12
Electronic configuration = $1s^2 2s^2 2p^2$
- * It has four electrons in the last orbital and tends to gain four more electrons by forming four covalent bonds with other hydrogen atoms.
- * Thus the structural formula of the simplest hydrocarbon methane (CH_4) can be written as :-

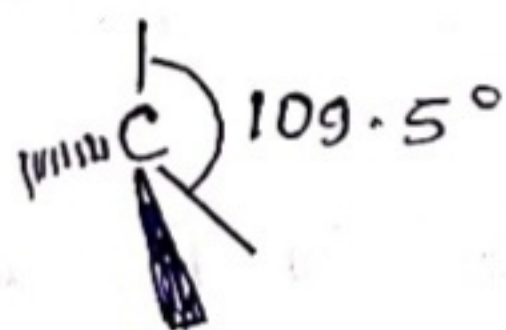


2.
* Similarly in all organic molecules carbon atom is tetravalent.

That is, it has a valency of 4.

* According to Le-Bel and Van't Hoff the four valencies of carbon do not lie in one plane.

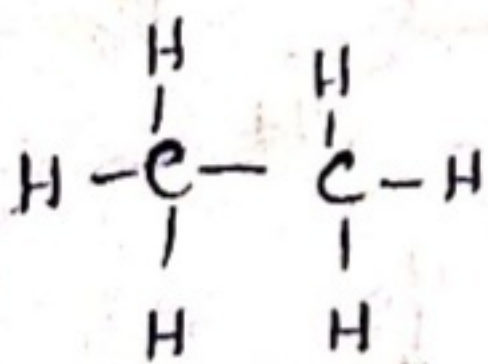
* They are directed towards the corners of a regular tetrahedron so that the angle between any two valencies is 109.5° .



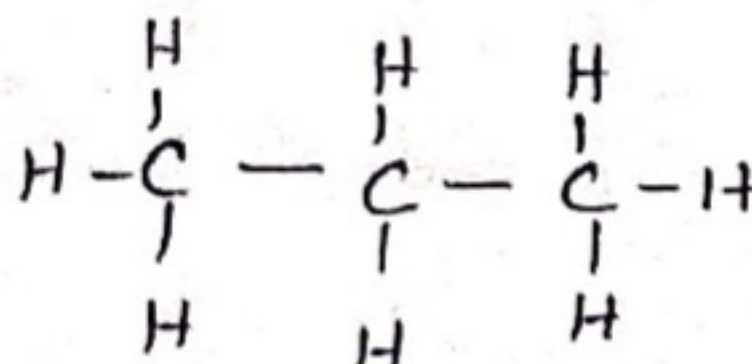
Carbon-Carbon Single bonds

Carbon atom has the wonderful property of uniting with other carbon atoms through covalent bonds.

e.g; ethane (C_2H_6)



Propane

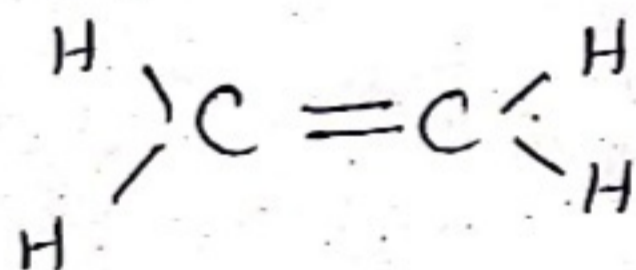


In these compounds all the carbon atoms linked by covalent bonds.

Carbon- Carbon double bonds

In some compounds, two of the valencies of a carbon atom may be satisfied by union with the two valencies of another carbon atom.

e.g; in ethene two carbons are united by two covalent bonds.



Ethylene — common name

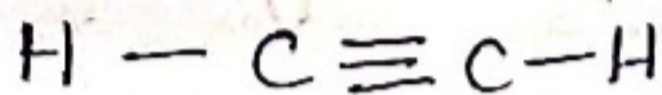
Ethene → IUPAC

* Such a union involving two covalent bonds between adjacent carbon atom is called double bond.

Carbon-Carbon Triple Bonds

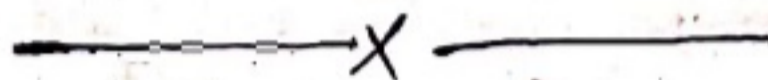
Sometimes two adjacent carbon atoms are linked together by three covalent bonds.

Thus, C_2H_2 molecule has carbon-carbon triple bonds.



Ethyne

(acetylene)



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