

SHORT NOTES

1.

25-07-2020

(From Previous year)

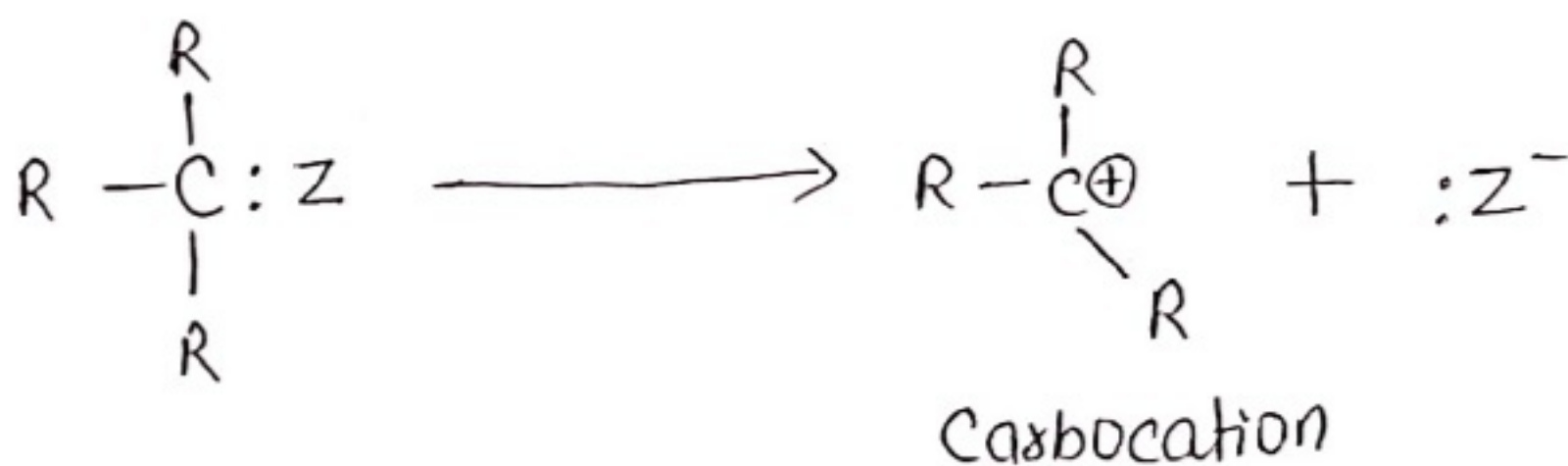
By-Dr.Rinky

For Degree-II (Sub.)

CARBOCATION

or CARBONIUM ION

- * Carbonium ions are positively charged species containing a carbon atom having only six electrons in three bonds.
- * The carbon atom lacks a pair of electrons in its valence shell.
- * They are formed by heterolytic cleavage of bonds.



R = H or alkyl or aryl group.

Z = more electronegative than carbon.

- * The positively charged carbon atom in a carbonium ion use sp^2 hybrid orbitals to form three σ -bond. A vacant p-orbital extends above and below the plane of the σ -bond.

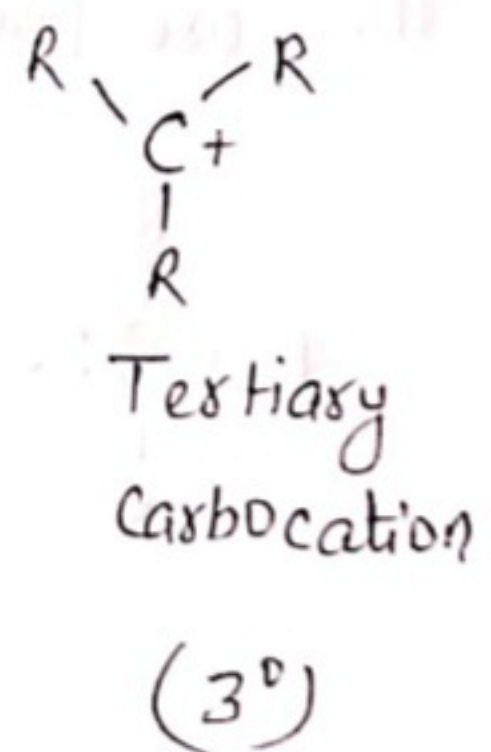
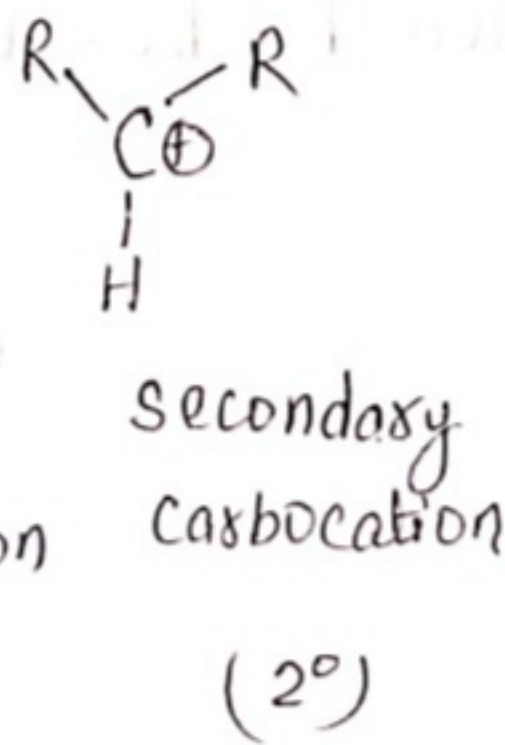
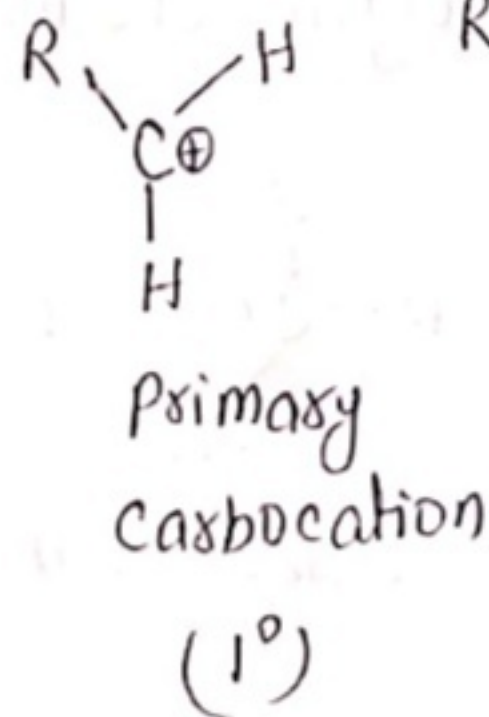
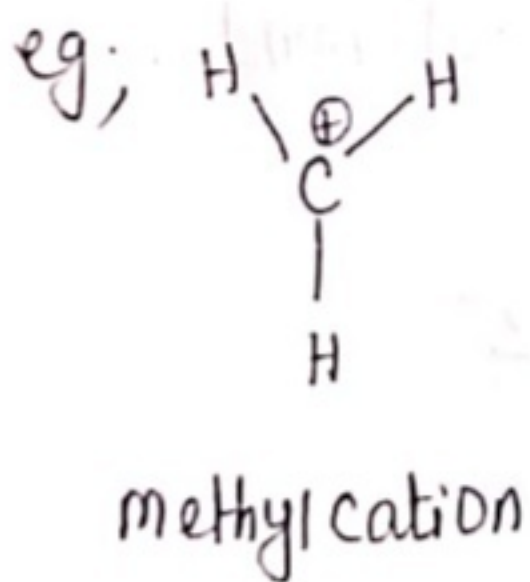
Thus, a carbonium ion will combine with any substance which can donate a pair of electrons.



Hybridisation = sp^2

Geometry = Trigonal Planar

Carbonium ions are classified as primary, secondary or tertiary depending upon the nature of the carbon atom bearing the positive charge.



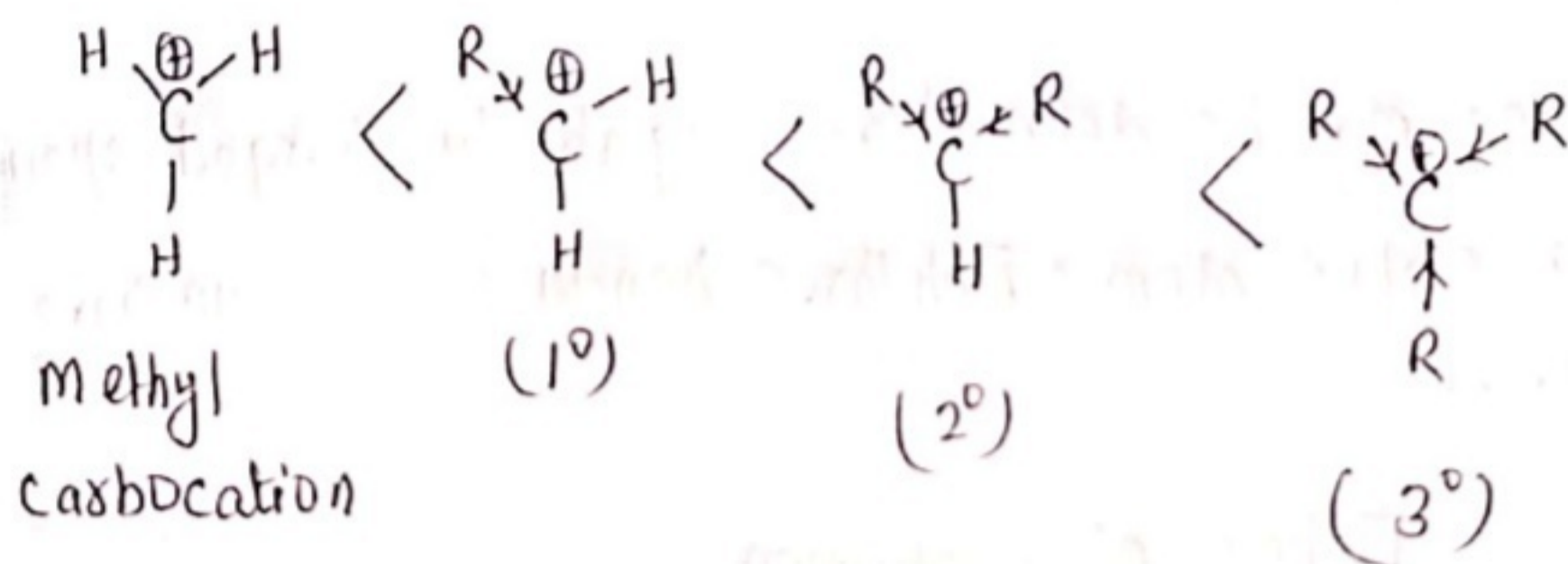
Stability of Carbocation

According to laws of physics, the stability of a charged system is increased by dispersal of the charge.

Therefore, any factor that tends to

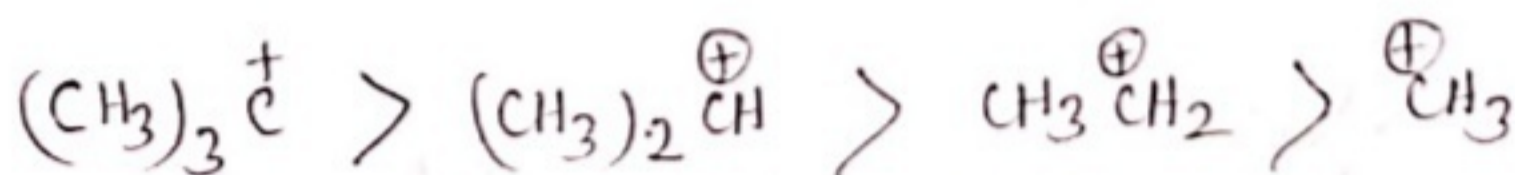
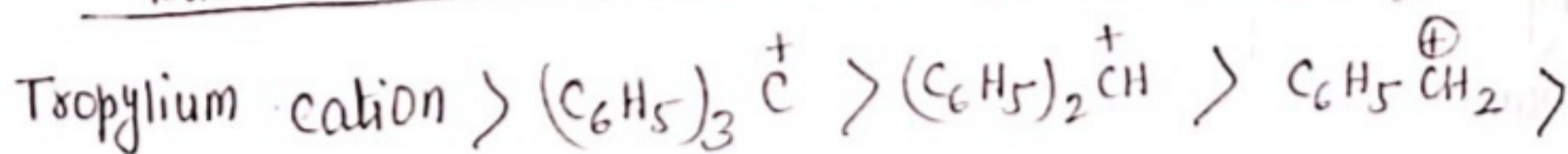
Spread out the +ve charge of the electron-deficient carbon and distribute it over the rest of the ion must stabilize a carbocation.

Relative stability



Base of stability: - Inductive effect of alkyl group.

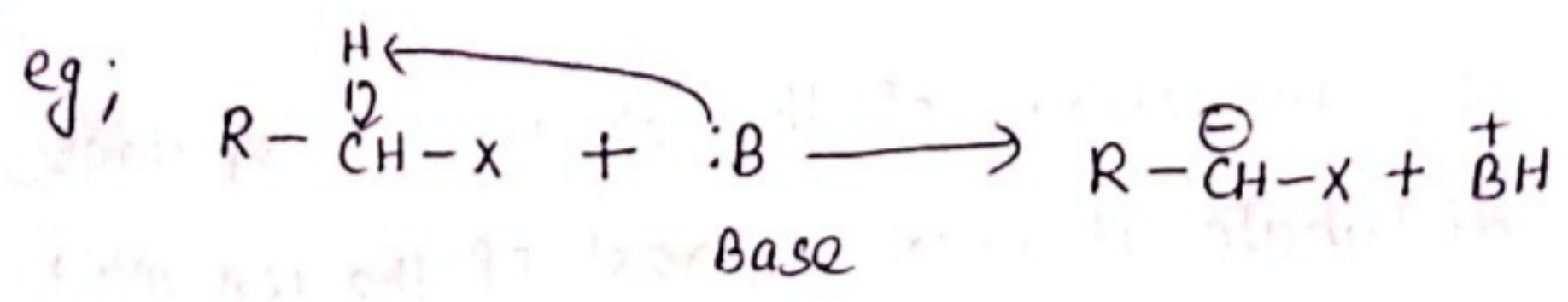
Base of stability: - Resonating structure \rightarrow



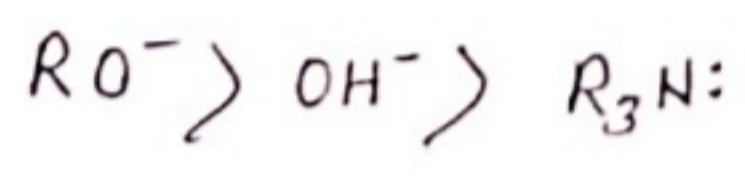
Base of stability: - Inductive effect. \rightarrow

CARBANION

Certain organic compounds when treated with strong Lewis bases lose a hydrogen atom from a C-H bond, as a proton thus form anionic species known as carbanion.

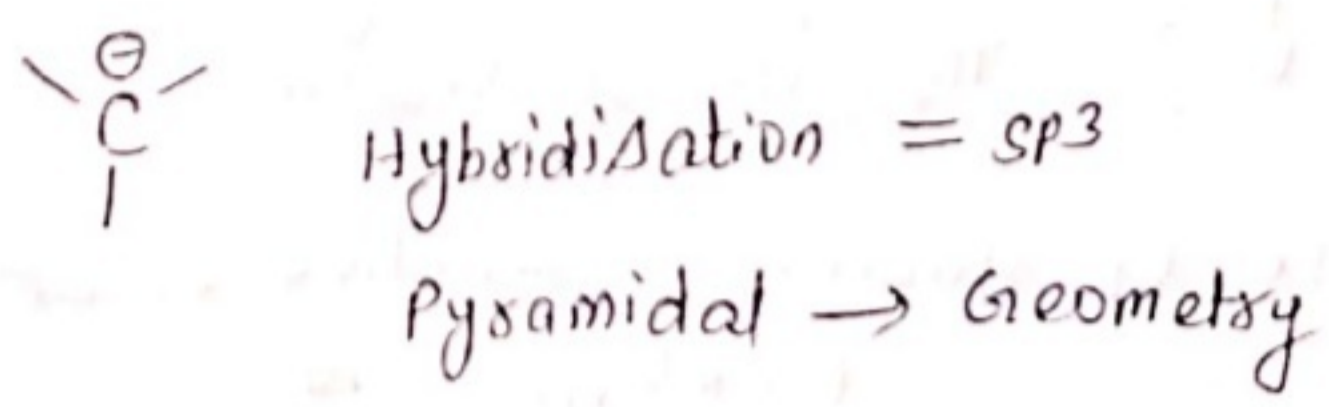
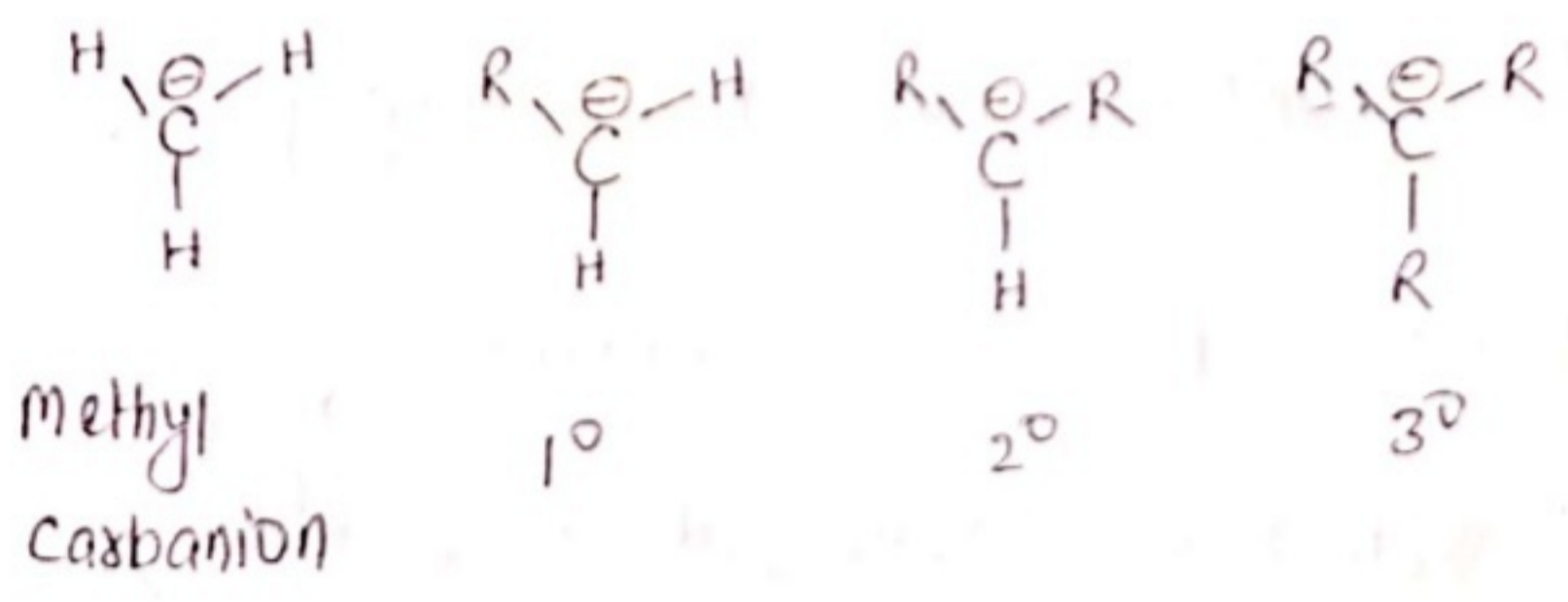


* Base commonly used for this purpose along with relative basic strength are:-



Thus carbanion may be defined as negatively charged species containing a carbon atom with three bonds and an unshared pair of electrons.

Types of Carbanion



Stability of Carbanions

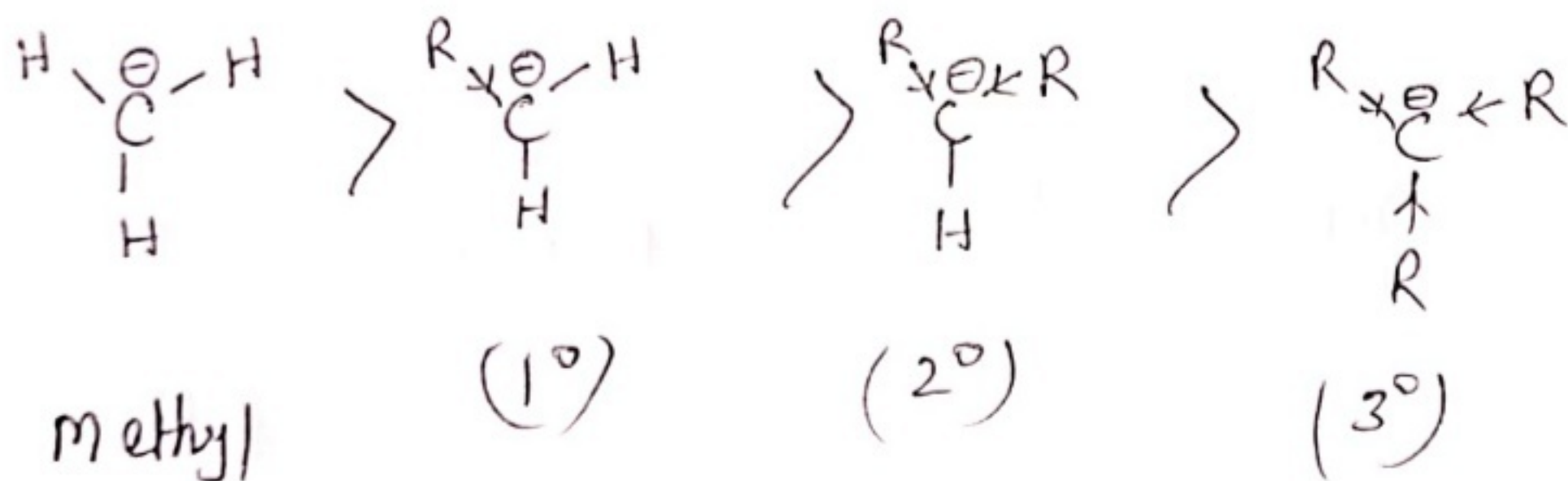
Like carbocation, there are two types of carbanions, viz, stable and transient.

5.

* The carbanion formation and stability are increased when the negative charge on the carbanion can spread over a number of resonance structures.

* More the possibility of spreading the negative charge over more resonating structures, more the carbanion will be stable.

Methyl carbanion $>$ 1° carbanion $>$ 2° carbanion $>$ 3° carbanion



Completed..