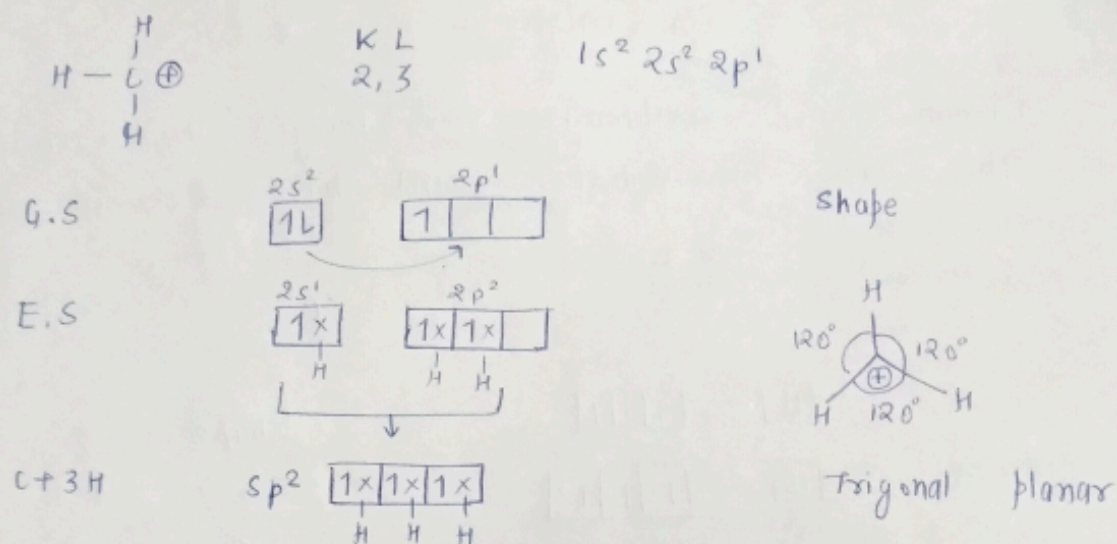


Carbocations

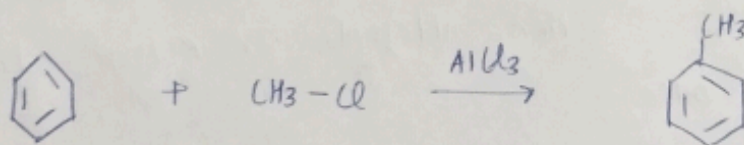
The carbon species containing positive charge, are carbocations. They are intermediates and have six electrons in the octet.



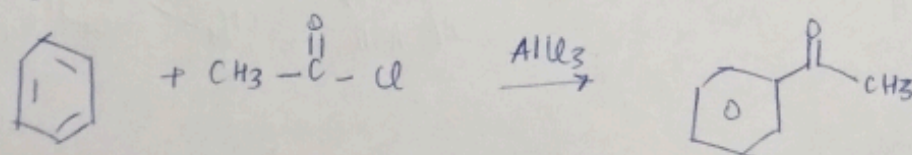
Formation of Carbocation

① Friedel Crafts Reaction :-

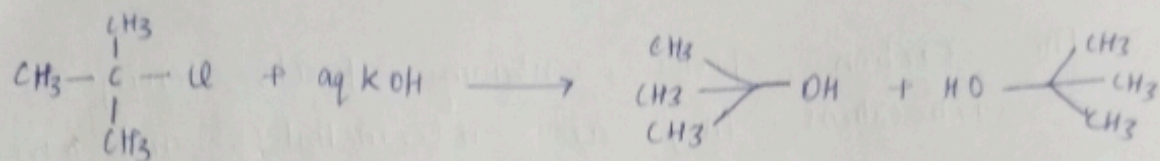
When benzene is treated with alkyl halide or acyl halide in presence of Lewis acid like AlCl_3 .



② Acylation :-

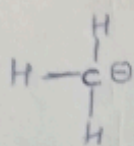


- ③ S_N1 Rxn^o. In this C^+ is formed when tertiary alkyl halide is treated with aq. KOH.



Carbanions :-

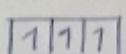
Carbon species containing -ve charge are carbanions. These are intermediates and have 8e⁻ in octet.



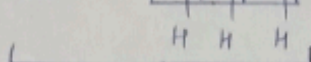
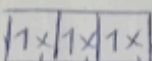
K L
2 5

$1s^2 2s^2 2p^3$

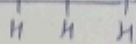
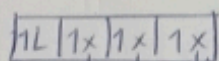
G.S



E.S

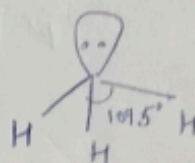


C + 3H



sp^3

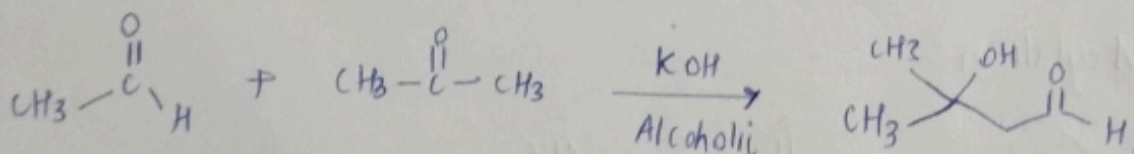
shape



Pyramidal shape.

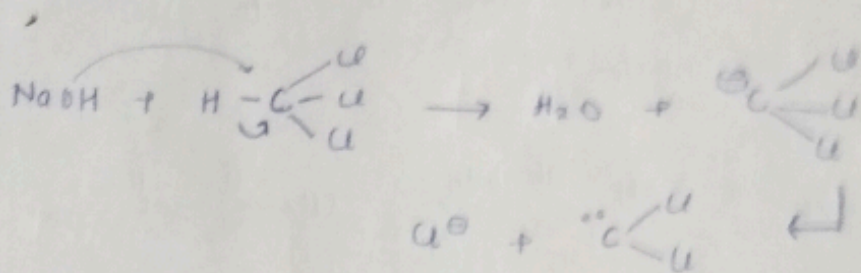
Formation of Carbanion :-

- ① Aldol Condensation :- In this carbanion formed as intermediate when aldehyde or ketone treated with strong base.

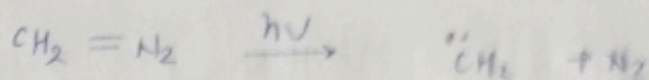


Formation of Carbene

(1) By reaction of chloroform with base.



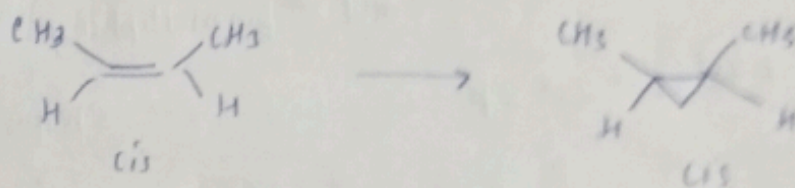
(2) When diazomethane irradiated with light



Reaction of Carbene

(1) Singlet Carbene : It is stereospecific

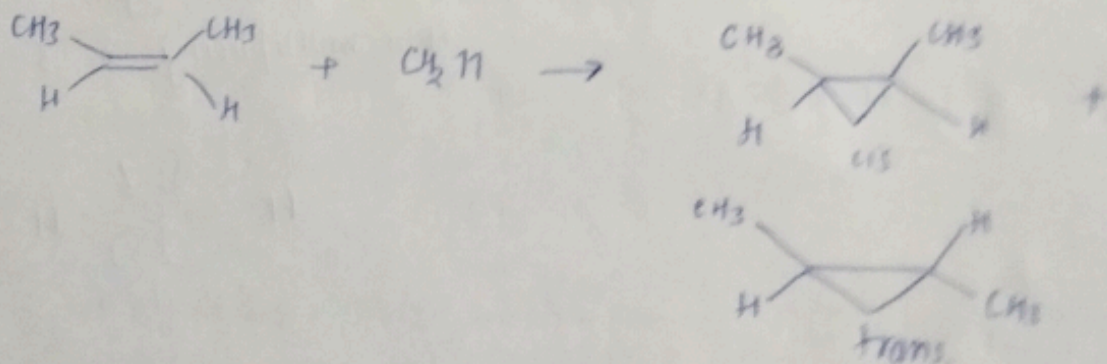
i.e. cis alkene forms cis product and trans



(2) Triplet Carbene :

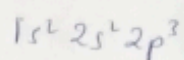
It is non-stereospecific

i.e. cis or trans alkene both give cis and trans

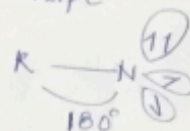


Nitrene :

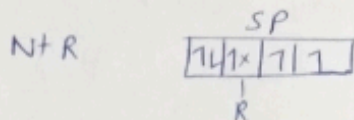
They are intermediates and Ge in octet.



shape



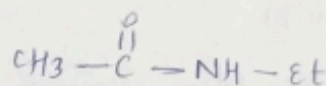
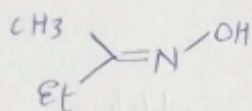
Linear.



Formation of Nitrene

① Beckmann Rearrangement :

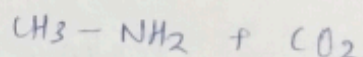
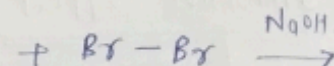
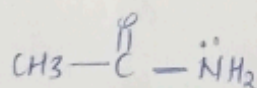
When keto oxime is treated with acid.



N-substituted amide

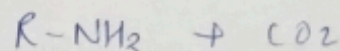
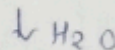
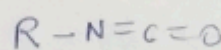
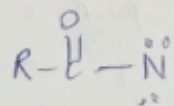
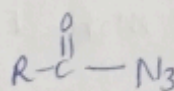
② Hoffmann Rearrangement.

When acetamide treated with $Br_2/NaOH$.



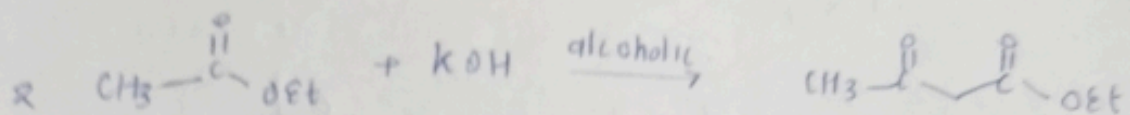
③ Curtius Rearrangement :

Acid azide on heating to give nitrene



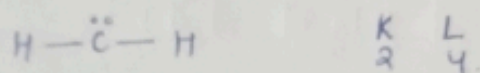
② Claisen Condensation :-

When two molecules of Lewis fatty esters are treated with strong base to give carbanion as a intermediate.

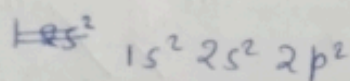


Carbene :-

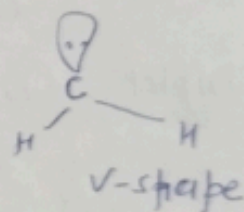
Carbon species containing two radical is carbene. It is rxn intermediate and has 6e- in octet.



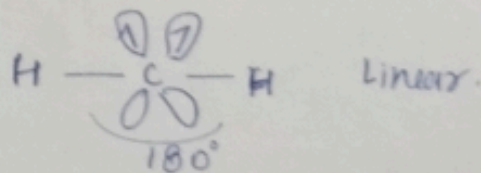
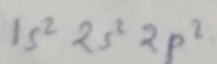
① Singlet Carbene :- Both the e- are in opp spin and spin multiplicity is one.



Shape

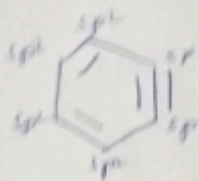


② Triplet Carbene :- Both e- in parallel spin & spin multiplicity is 3.



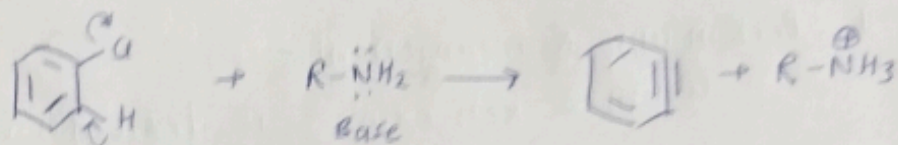
Benzynes :-

Two carbon in sp & rest four in sp^2



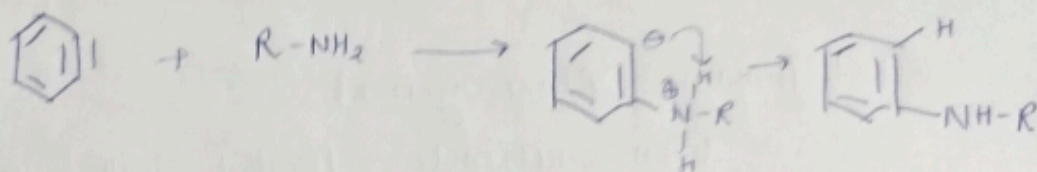
Formation of Benzyne

① Chlorobenzene with base.



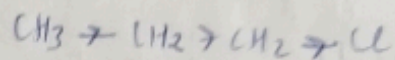
Reaction

① Generally gives nucleophilic addition.

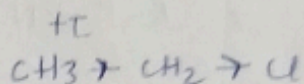


Inductive Effect

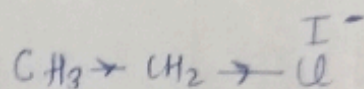
Tendency of shifting e^- towards more electronegative atom.



① I^+ When atom push e^- towards more EN atom.



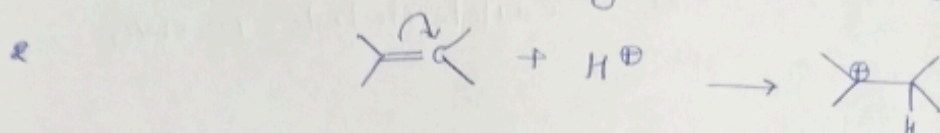
② I^- When atom attracts e^- towards it.



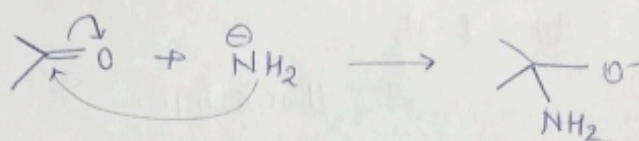
Electromeric Effect

separation of charge by attacking species

- ① E^+ Transfer of e^- towards positively charged species and attacking species are electrophile.



- ② E^- When attacking species are Nucleophile. e^- transferred from nucleophile to substrate molecule.



Mesomeric Effect

Polarity produced in molecule by interaction of two pi bonds or between a pi bond and lone pair of e^- present on a adjacent atom.

- ① M^+ : when group or atom donate e^- pair to the conjugated system.

