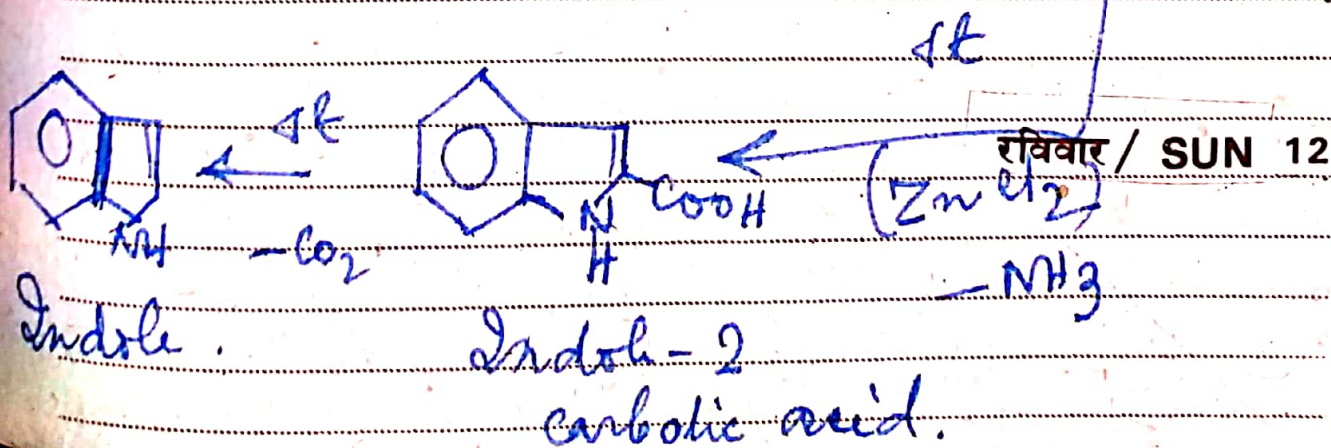
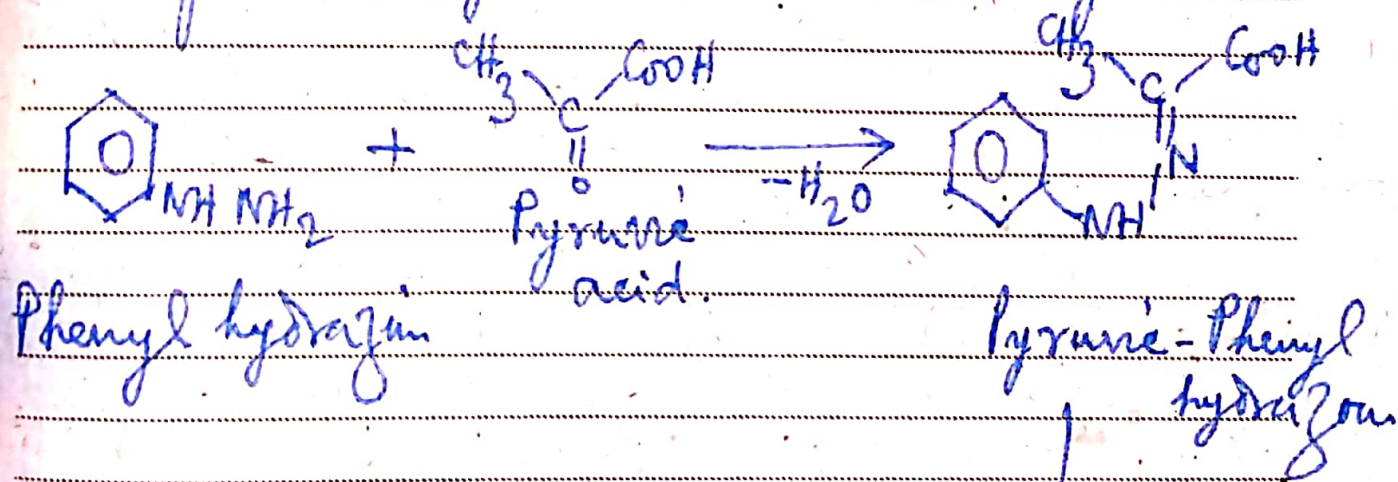


# Indole or Benzopyrrole

Introduction:-

Although it is benzopyrrole, the name ~~was~~ Indole is more prominent as first obtained by distilling oxidole with Zn dust. It occurs in coal tar and in oil of Jasmine & orange blossom. It is also found in some alkaloids and amino acids. Indole also like pyrrole produces red colour with pine wood moistened with conc HCl.

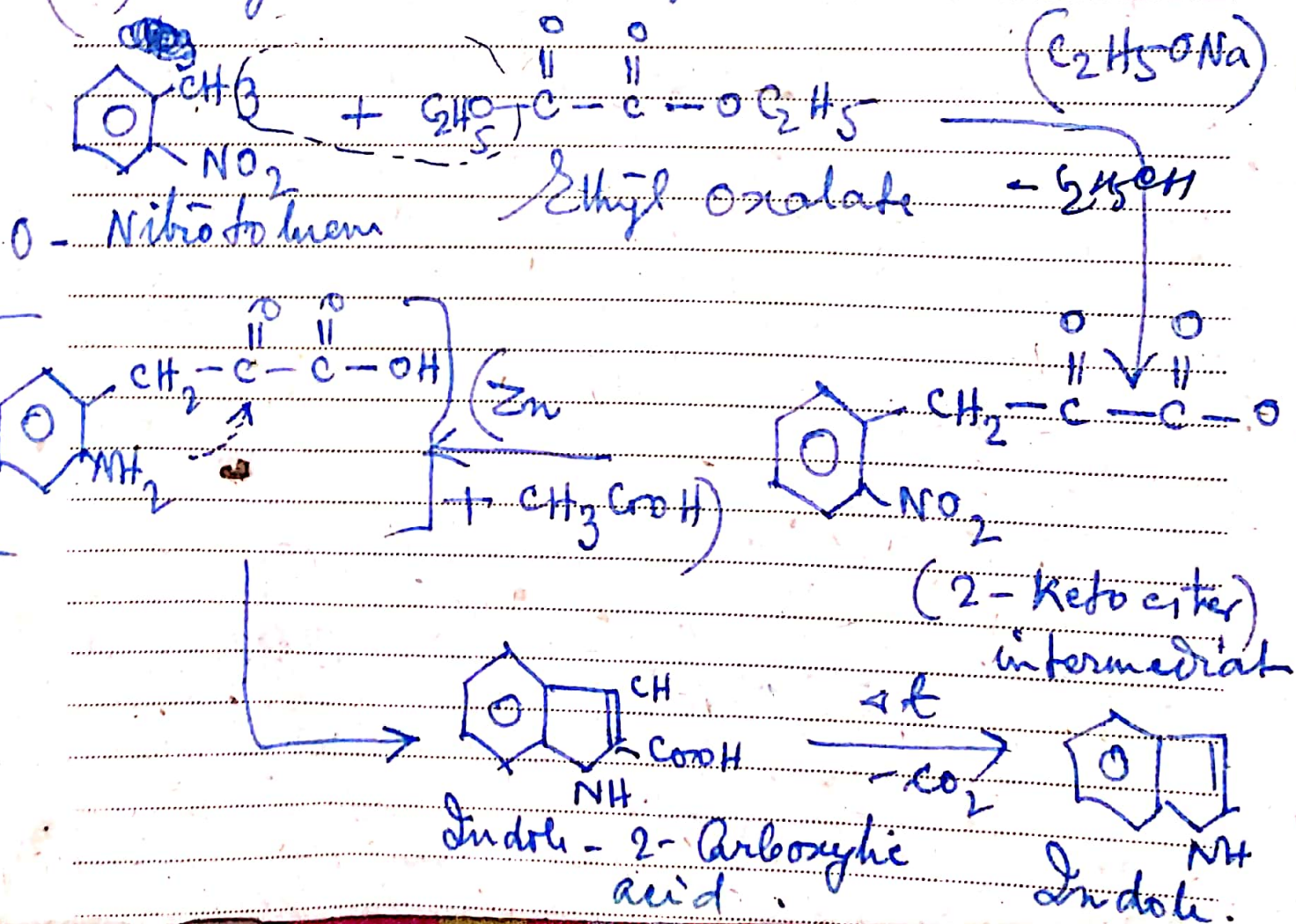
Prep:- By Fischer Indole Synthesis.

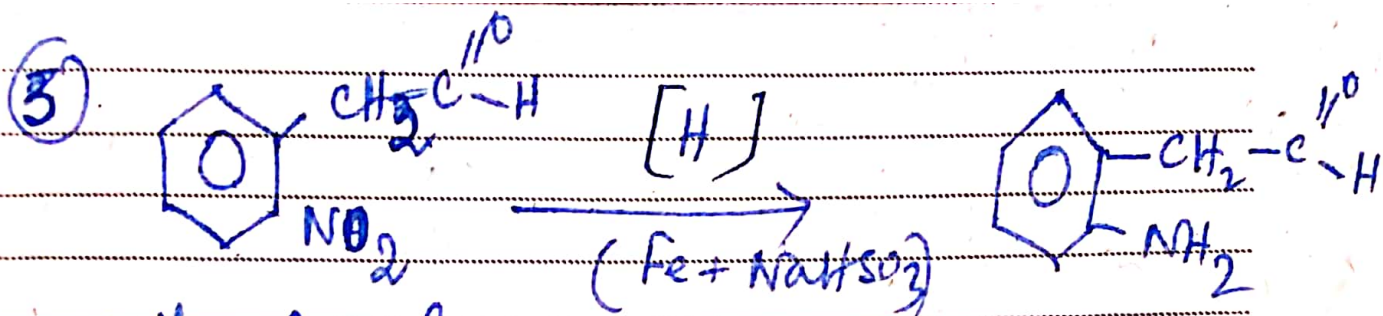




On treating phenylhydrazine with pyruvic acid we get Pyruvic-Phenyl hydrazone. This is heated with anhydrous  $ZnCl_2$  to get indole-2-carboxylic acid which, on subsequent decarboxylation gives indole.

(2) By Reissert Synthesis: —

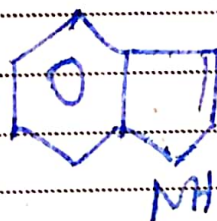




O - Nitro. phenyl  
acetaldehyde.

O - Amino phenyl  
acetaldehyde.

on heating  
cyclises.



-H<sub>2</sub>O.

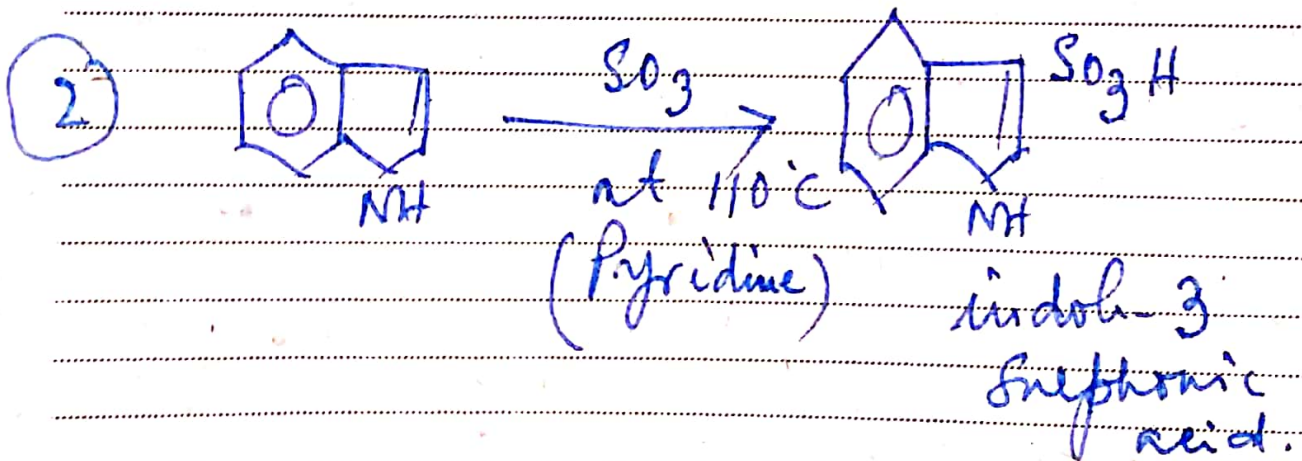
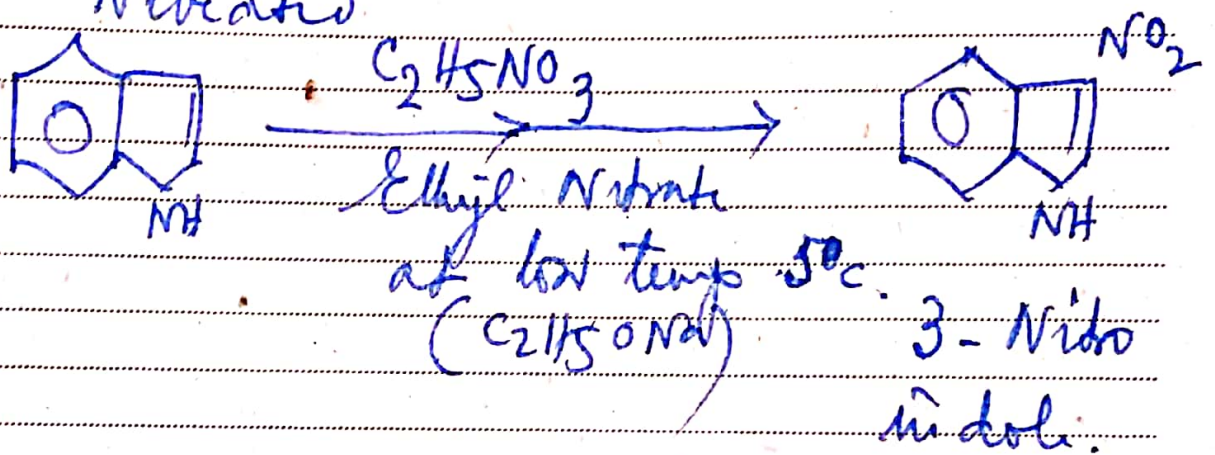
prop. (frag), colourless, volatile solid,  
mp. 52°C, sparingly soluble in cold water  
but soluble in hot water and organic  
solvents, flowery odour in low concentration  
used as perfumes.

Chemical prop.

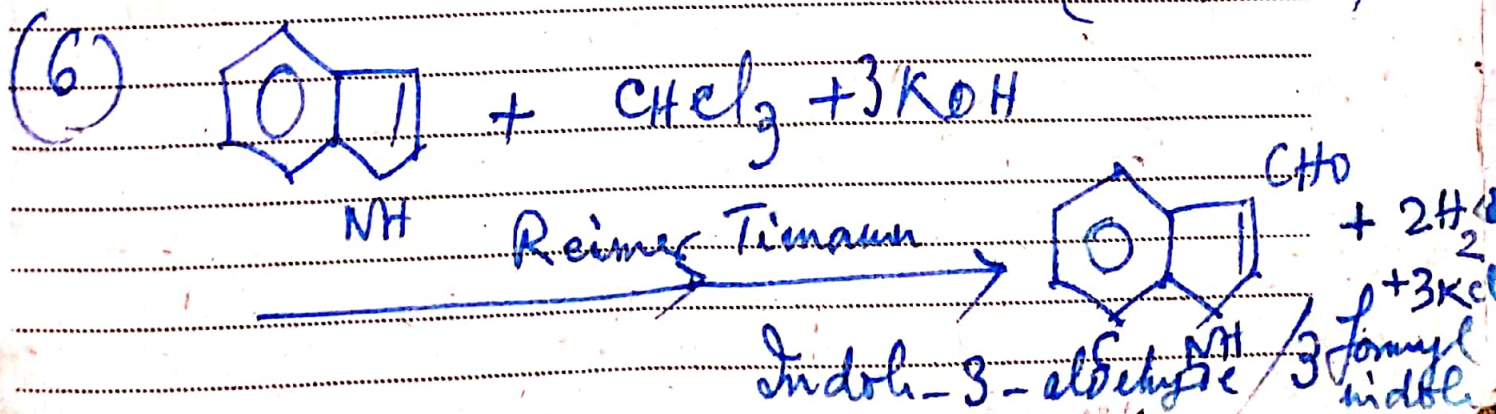
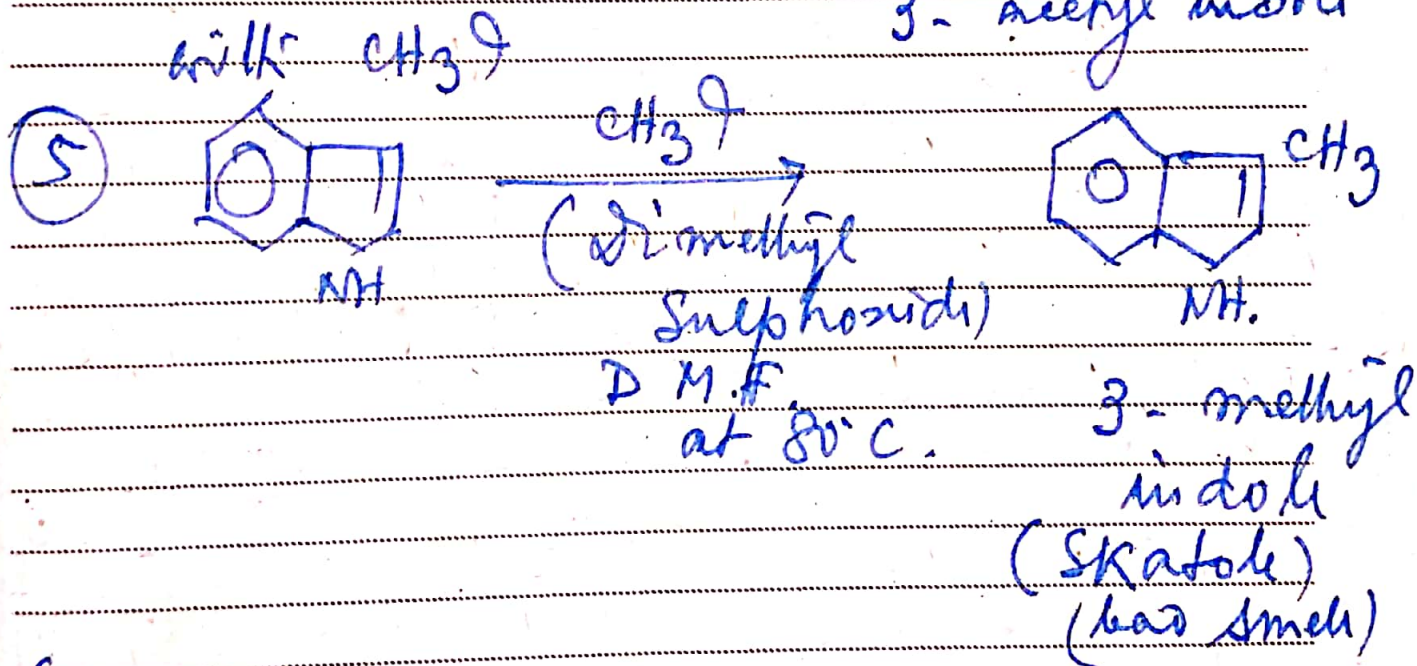
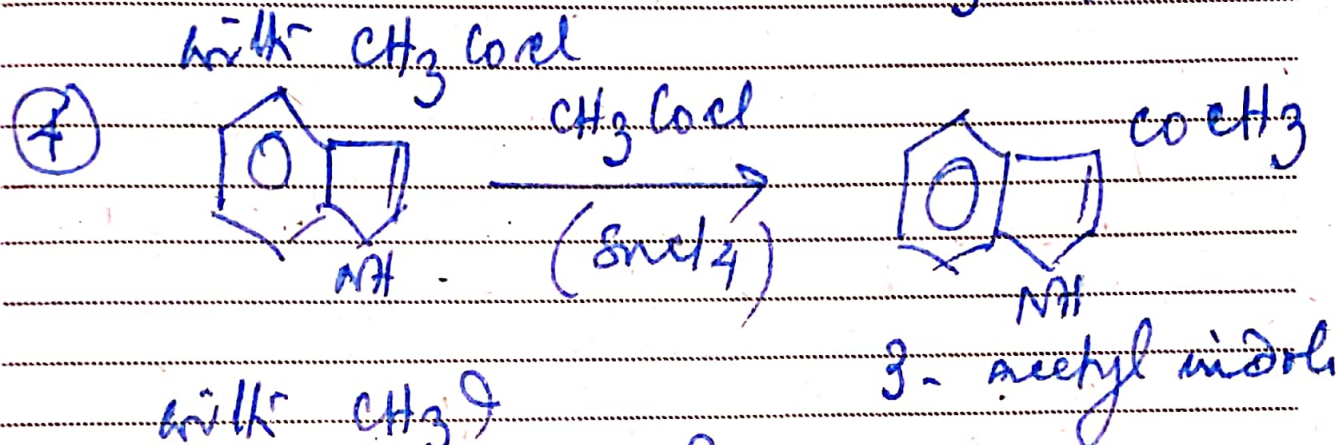
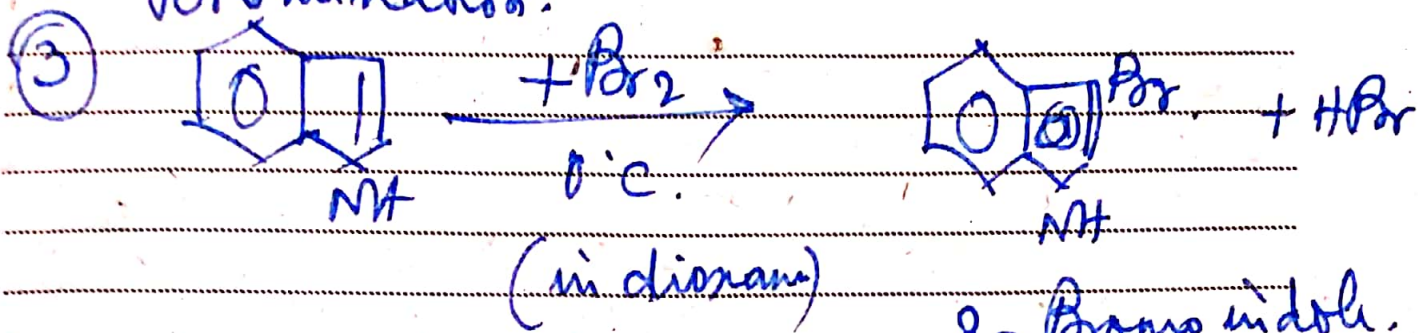


Substitution at C-3 are prominent.  
Substitution at C-2 occurs only  
when the 3-position is already  
blocked (Reasons as given below after  
the reactions)

(1) Nitration

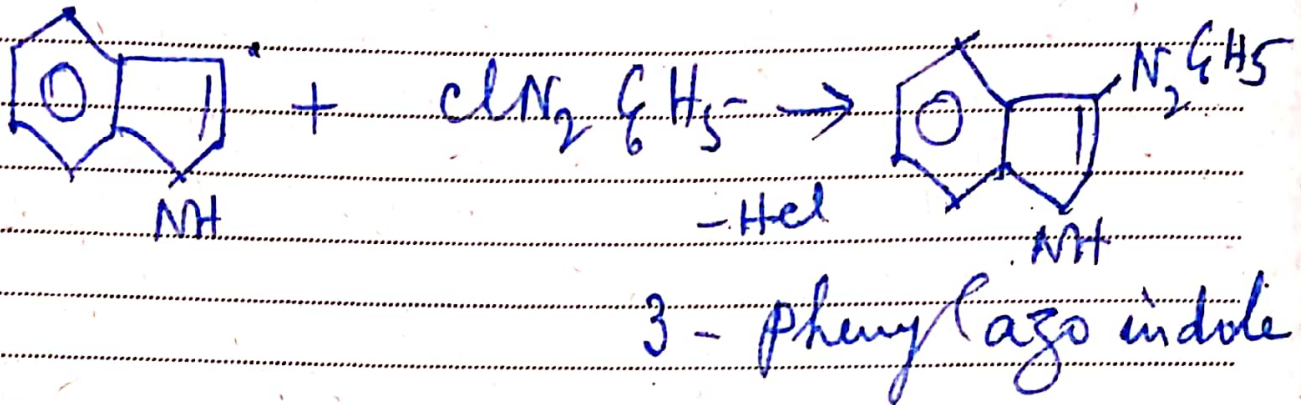


# Bromination.

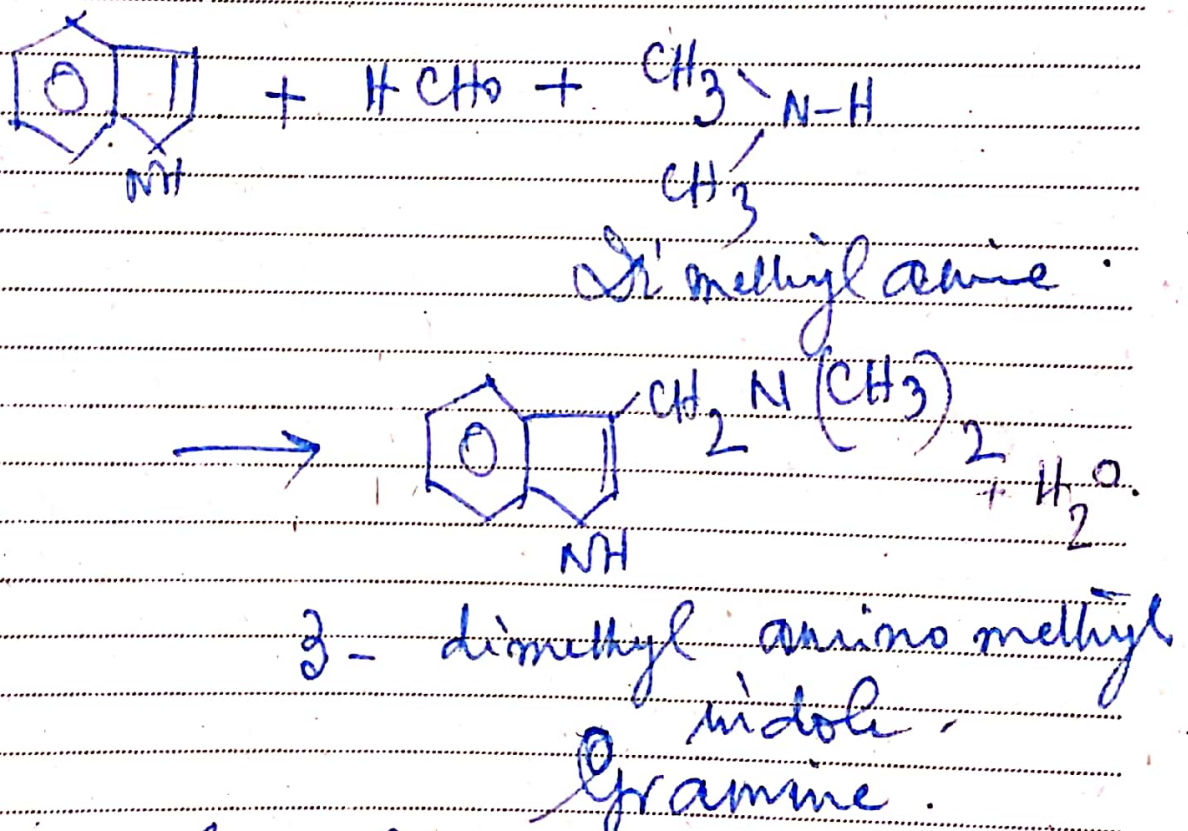




## ⑦ Stieglitz Coupling -



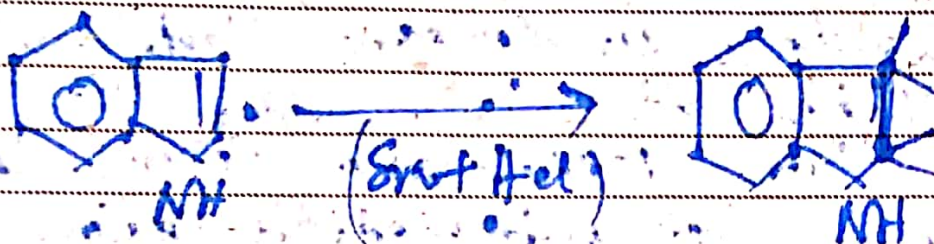
## ⑧ Mannich Rx



Waggoner

(used for poisoning barley)

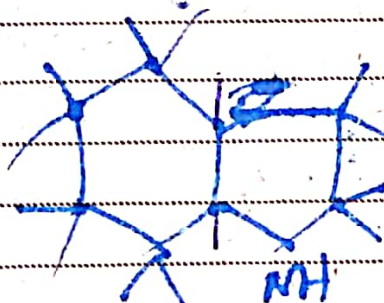
# (g) Reduction:



2,3-dihydro  
indole.  
(Indoline)

+ H<sub>2</sub>

(Ni)



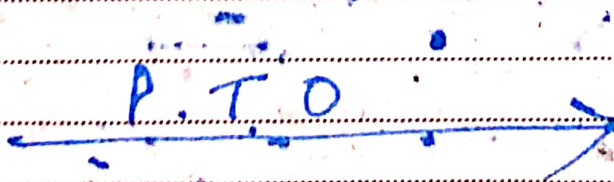
octahydro indole.



Why the electrophilic substitution does  
not occur at C-3 in indole?

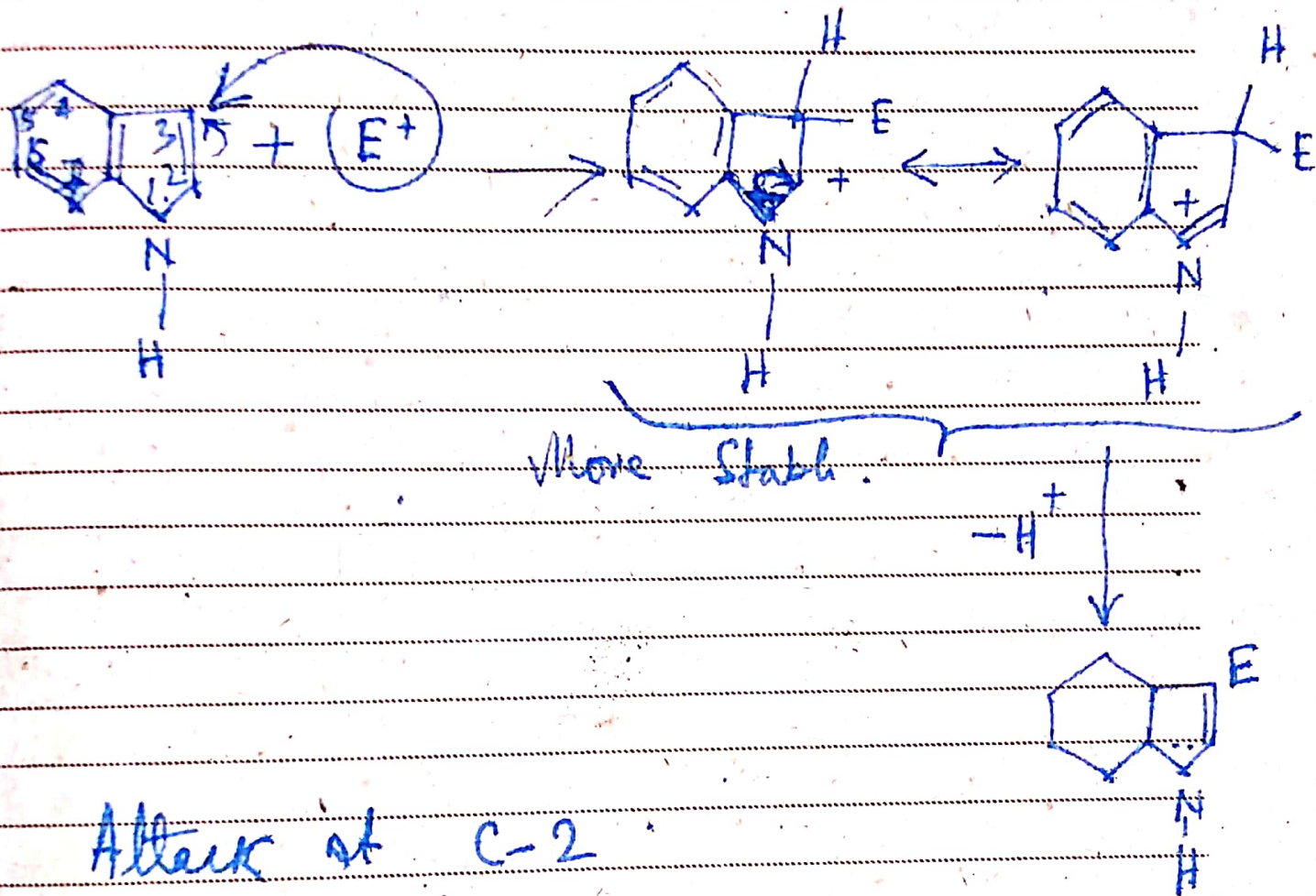
Ans:- Indole undergoes Electrophilic  
substitution at C-2, This is  
because two resonance forms can  
be written for intermediate cation obtained  
from attack at C-3 (without disturbing  
the benzene ring)  
Whereas only one such form is  
possible for substitution at C-2.

Attack at C-3

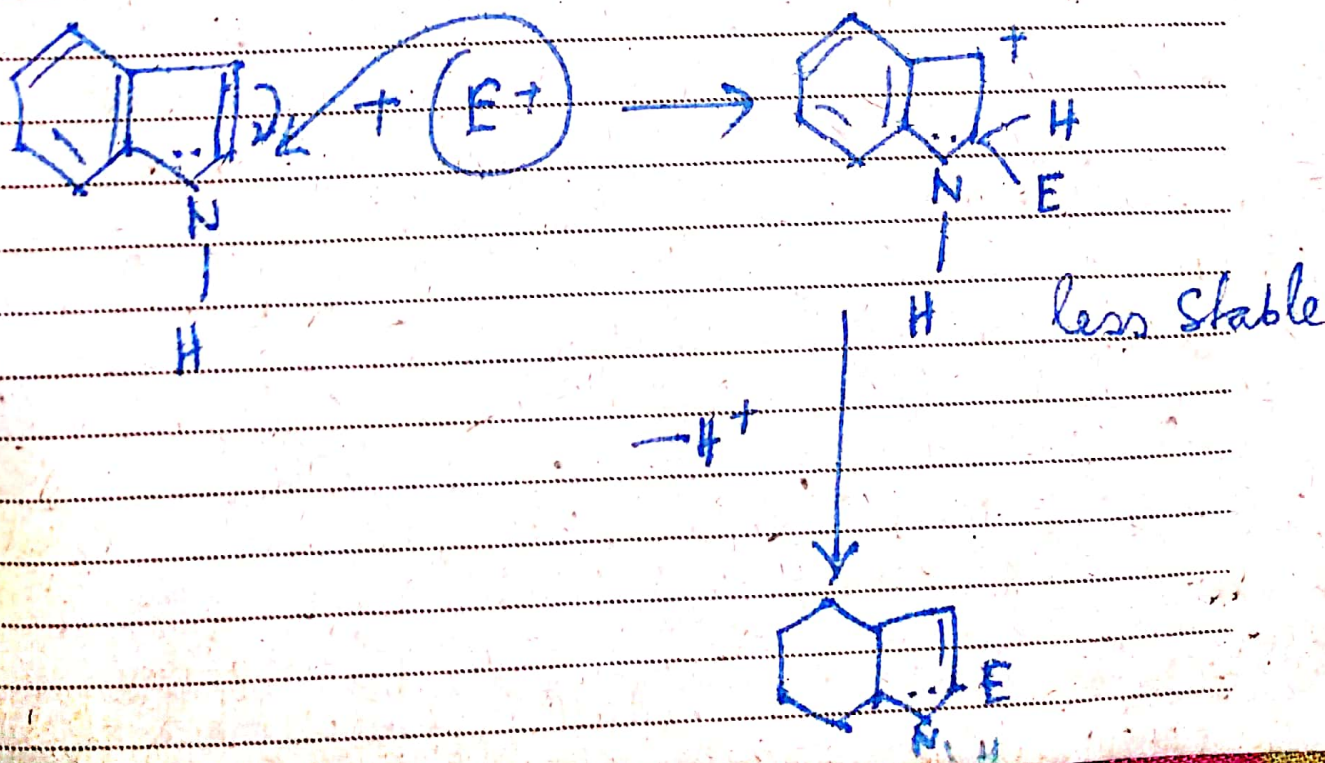




attack at C-3



Attack at C-2



Consequently the former intermediate is more stable and the product with a substitution at C-3 predominate.

Where as substitution at C-2 gives only one form.

However When C-3 is blocked, we may get the substitution product at C-2.