SYNTHETIC REAGENTS

LECTURE-5 ,DATE-07/08/2020

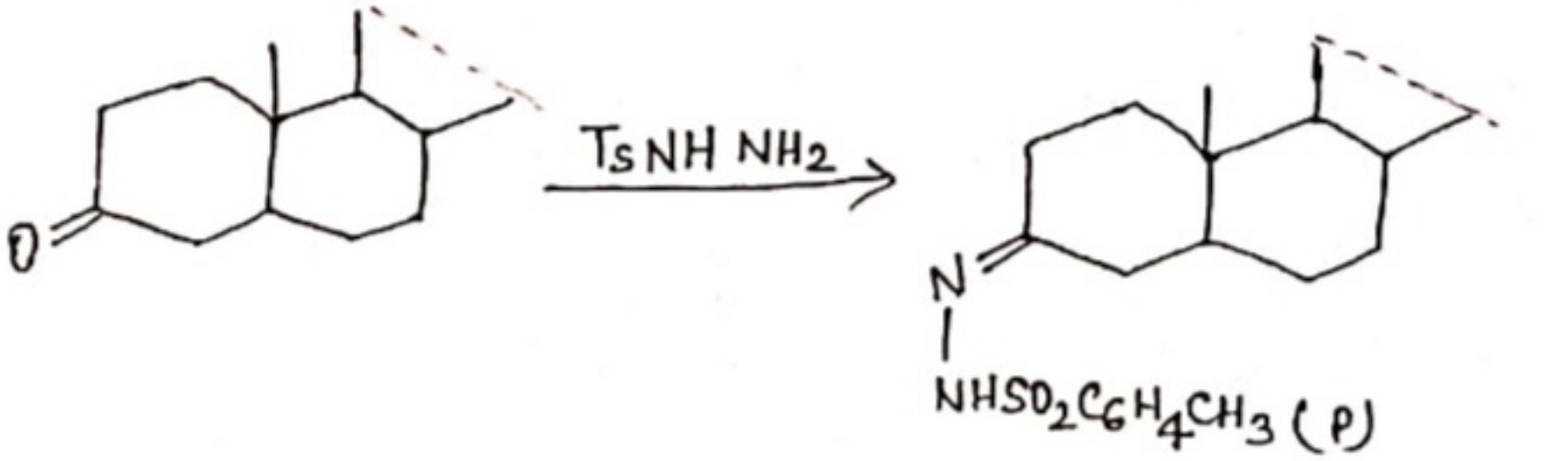
DEGREE-III (CHEMISTRY HONS.)

TOPIC :- SODIUM BOROHYDRIDE

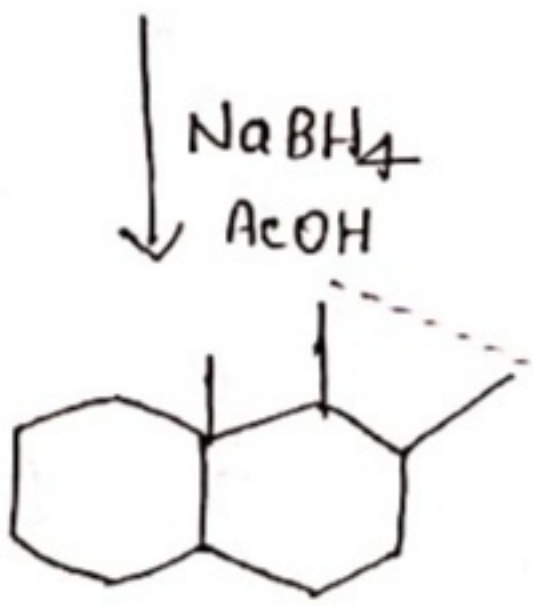
ORGANIC CHEMISTRY , PAPER-VII

Reduction of tosylhydrazones :-

* Tosylhydrazones can be reduced to the corresponding methylene compounds in 55-75% yield by $NaBH_4$ in AcOH.



Tosylhydrazone

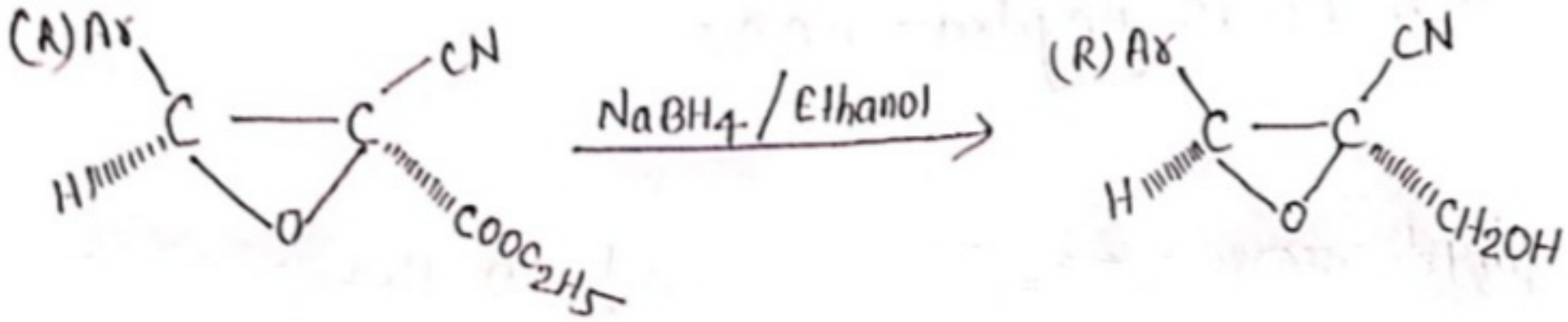


60-80 %

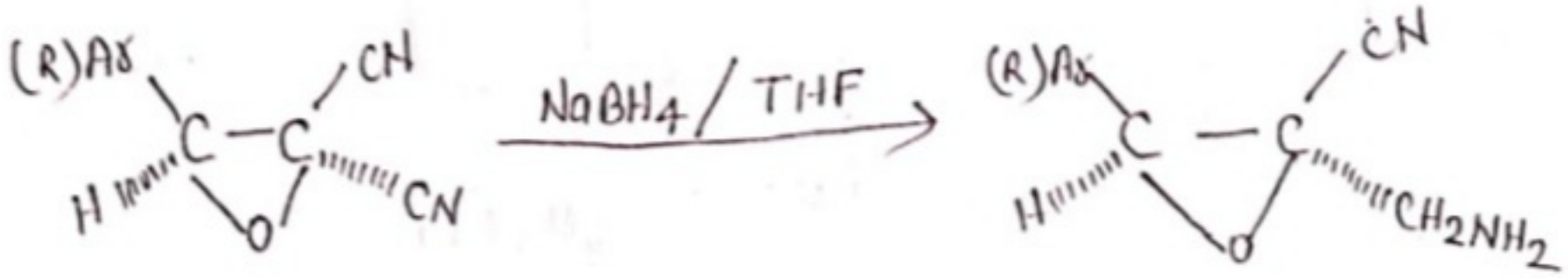
By-Dr.Rinky

Reduction of acid derivatives :-

It does not normally reduce esters, but reduction can be performed by the use of a large excess of reagent in MeOH or EtOH at room tempt. or at higher tempt.

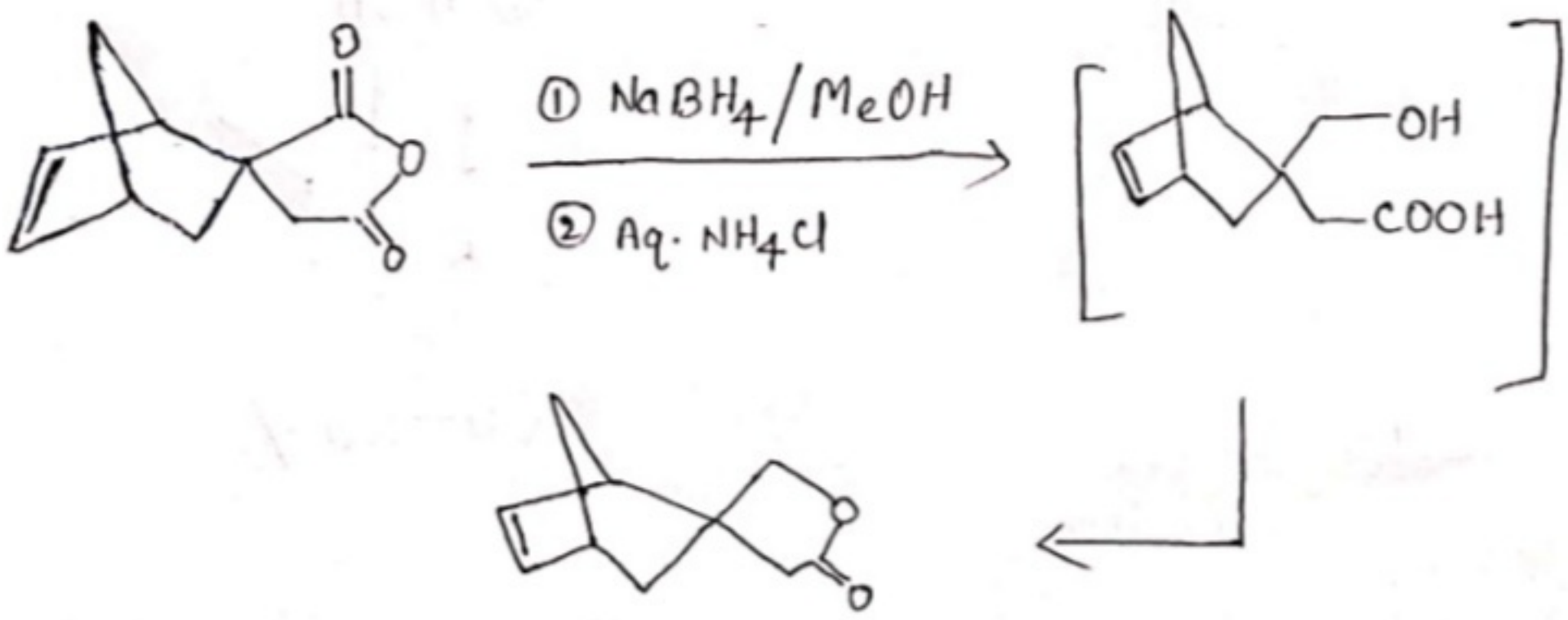


* It can reduce selectively one cyano group of 1,1-dicyano epoxide, which is trans to an alkyl or aryl substituent.

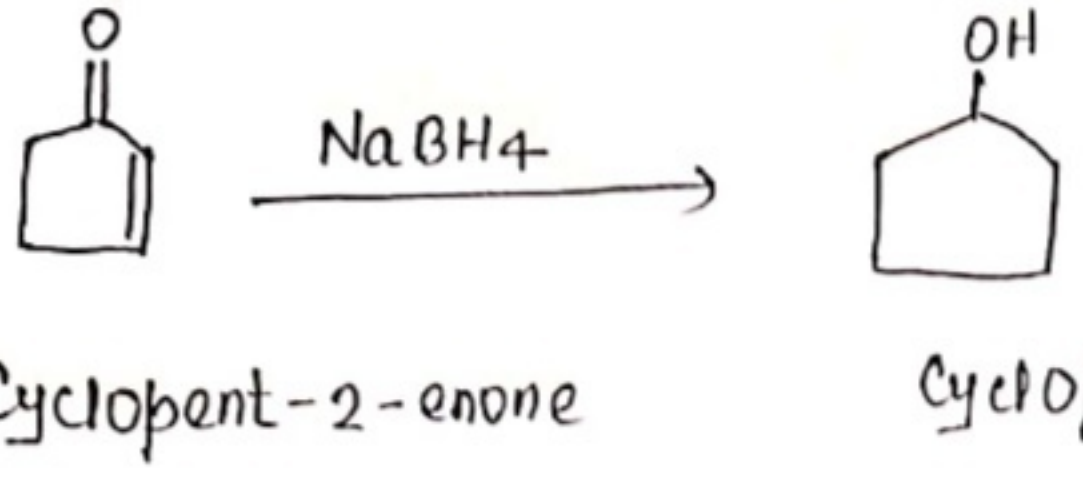


50-70%

* Anhydrides may be reduced to lactones with $NaBH_4$.

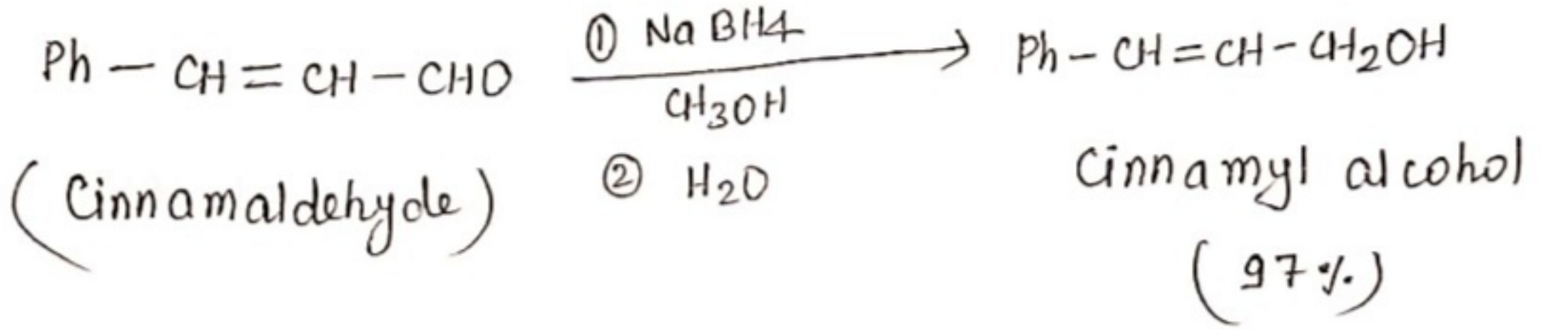


Reduction of α,β- Unsaturated carbonyls :-



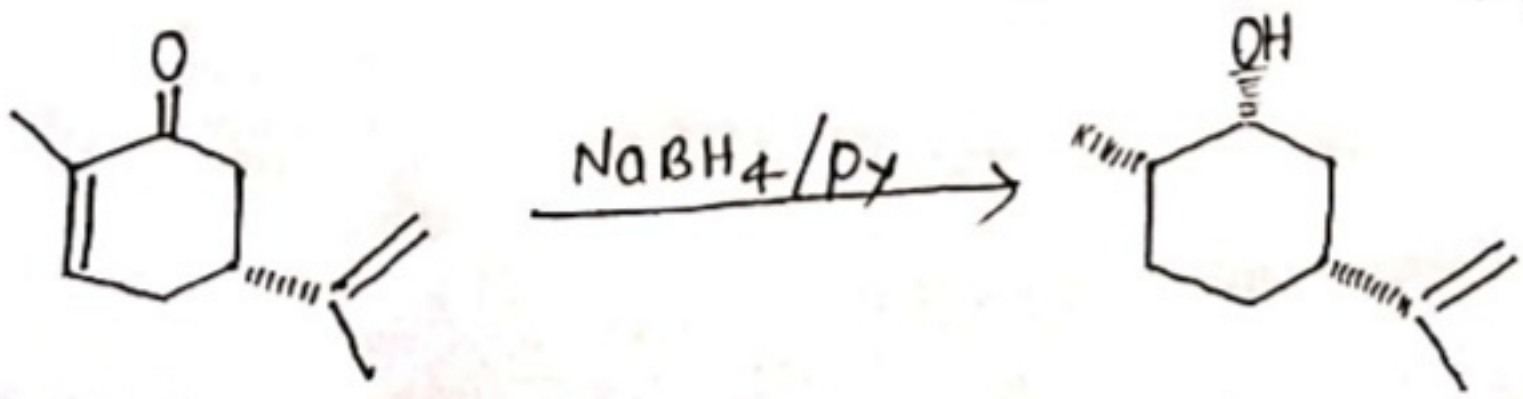
Cyclopent-2-enone → Cyclopentanol (100%)

* However, β-aryl-α,β-unsaturated aldehydes give more 1,2-reduction product than the corresponding α,β-unsaturated ketones.



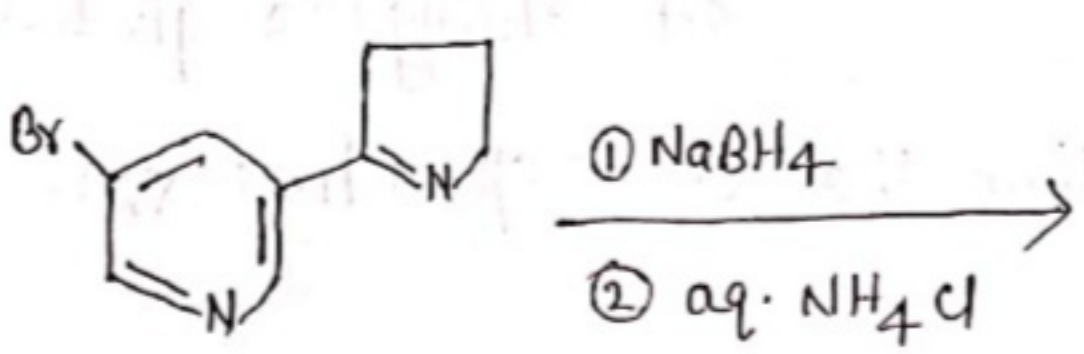
* The reduction of adjacent double bond to carbonyl group (1,4-reduction) depends upon the conditions such as tempt., solvent, amount of hydride used and the presence of catalyst.

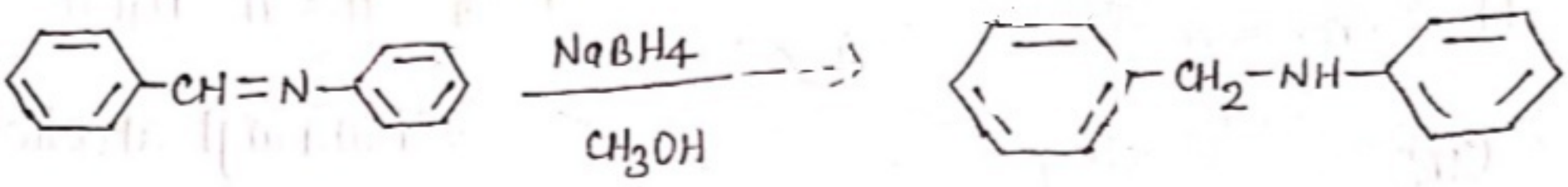
For example : The use of pyridine as solvent increases the selectivity for 1,4-reduction as examplified by the reduction of (R)-carvone to dihydrocarveol.



Reduction of C=N bond in enamines, imines and iminium salts.

* Imines can be reduced to amines with $NaBH_4$ in alcoholic solvents under neutral conditions, however, Protonation of the amino nitrogen dramatically increases the rate of reduction.



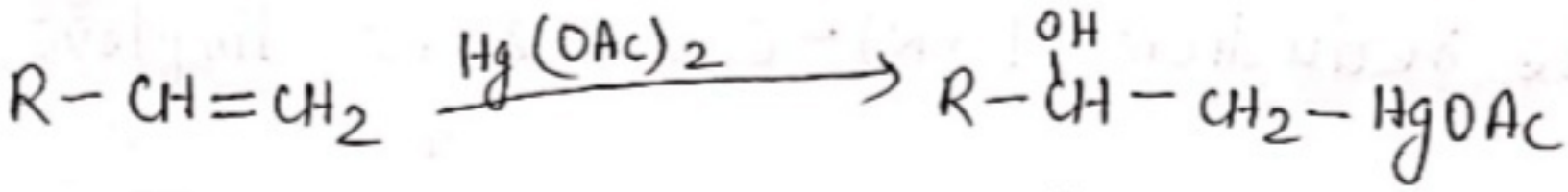


Benzalaniline

N-Benzylaniline

$NaBH_4$ is used in the two-step hydration of alkene.

An alkene first treated with mercuric acetate and the process is called oxymercuration, which is followed by reduction with $NaBH_4$ to generate alcohol.



SODIUM BOROHYDRIDE
COMPLETED