



Name of Subject : Pharmaceutical Organic Chemistry III

Subject Code : BP401TT

Name of Chapter : Stereochemistry

Name of Topic : Asymmetric Synthesis Partial and Absolute

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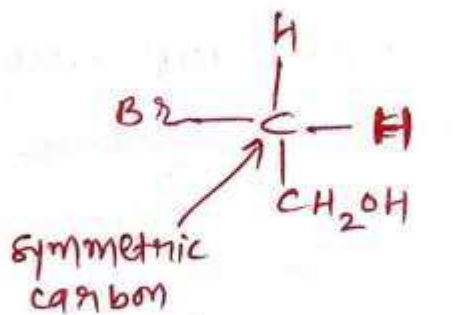
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* Asymmetric synthesis : Partial and Absolute

→ Symmetric and Asymmetric molecules &

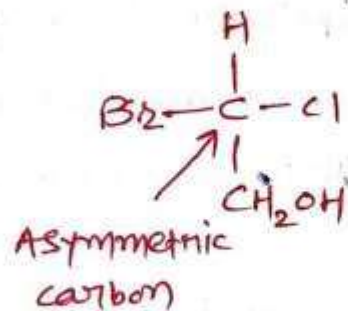
— A carbon atom that is not attached to four different atoms or groups is known as symmetric carbon and this molecule is known as symmetric molecule.



Symmetric molecule.

— Symmetric molecules are optically inactive and can not rotate plane of polarized light.

— A carbon atom that is attached with four different atoms or groups is known as asymmetric carbon and this molecule is known as asymmetric molecule.



Asymmetric molecule

— Asymmetric molecules are optically active and can rotate plane of polarized light either to clock wise (Dextro rotatory) or to anticlock wise (levo rotatory)

→ Racemic mixture &

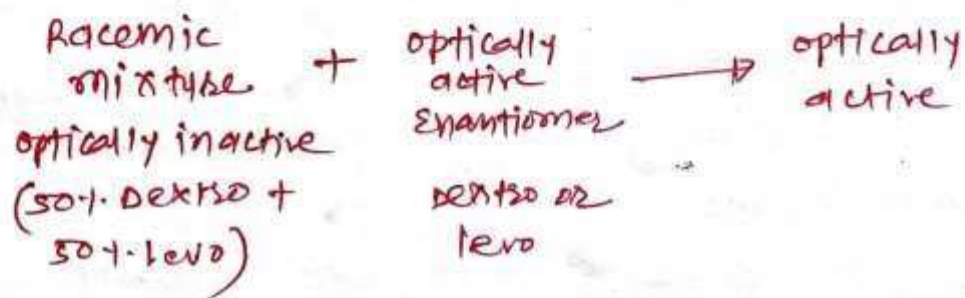
— A mixture that contains equal amount of dextro and levo enantiomers is known as racemic mixture.

— As, it contains equal amount of enantiomers (dextro & levo), it ~~is~~ can not rotate plane of polarized light and it is optically inactive.
 (Rotation done by dextro enantiomer will be nullified by levo enantiomer)

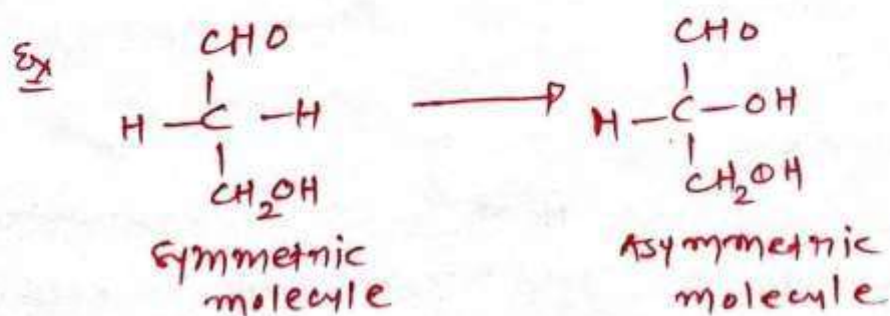
Asymmetric Synthesis &

(Synthesis of asymmetric molecule from symmetric molecule)

— In this method, optically active compound is directly prepared ~~by~~ from an optically inactive compounds under influence of some other optically active substance. This is known as asymmetric synthesis.



— So, that ~~of~~ optically inactive symmetric molecules are directly converted into optically active asymmetric molecules. This synthesis is known as asymmetric synthesis.



Partial abs

Asymmetric synthesis is of two types: based on use of or without use of enantiomers.

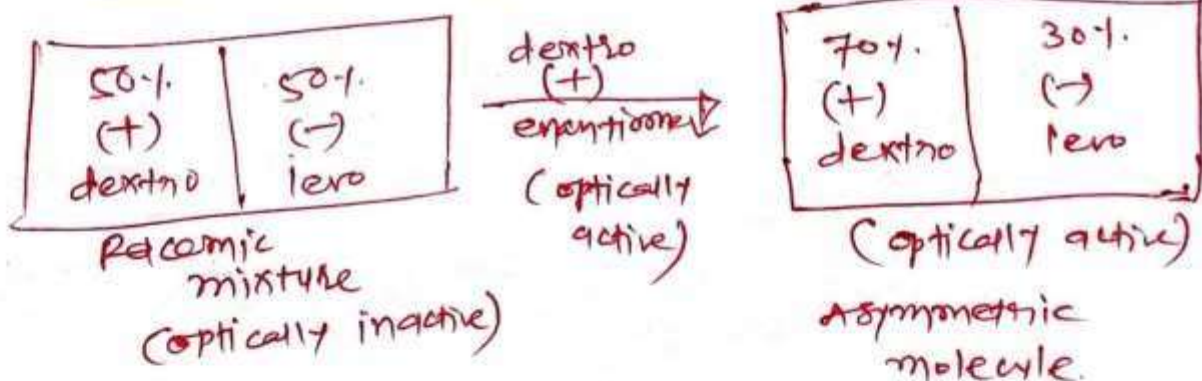
- 1) partial asymmetric synthesis
- 2) Absolute asymmetric synthesis

1) Partial asymmetric synthesis

- In this, Both (+) dextro and (-) levo enantiomers are formed but one of these is obtained in larger amount.
- So, both enantiomers that produced will not be in equal amount and act as optically active compound and rotate the plane of polarized light.

Ex. Glucose.

- Here, synthesis of optically active compound from optically inactive substrate is done by using enantiomers.



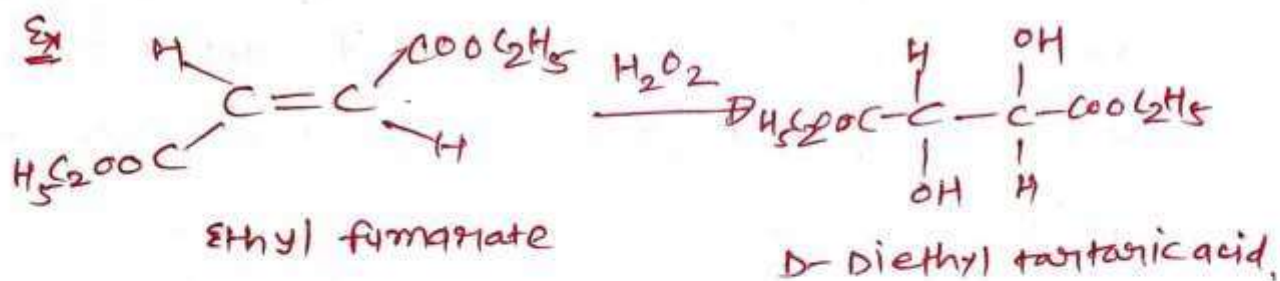
2) Absolute asymmetric synthesis

- In this synthesis of optically active product from optically inactive substrate without using enantiomers.

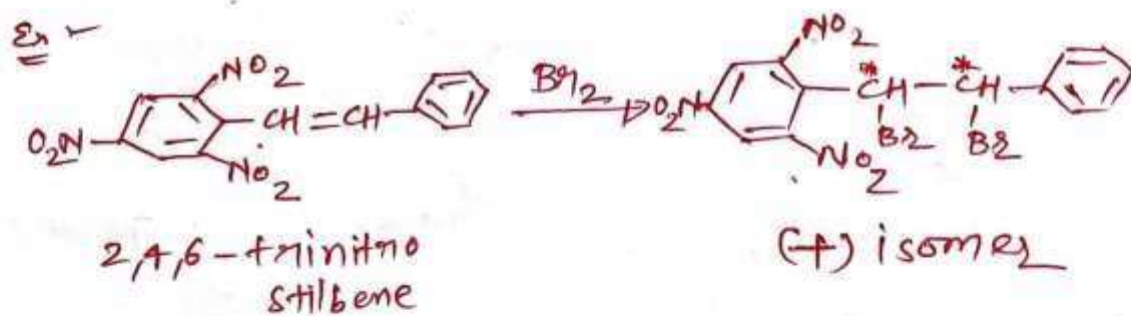
— In this synthesis, racemic mixture (symmetric molecules) is completely convert into optically active compounds. (either dextro or ~~levo~~ - any one)

— only one enantiomer will be formed in this synthesis.

— This synthesis requires physical agent (chemical) not enantiomer



— Here, ethyl fumarate and H_2O_2 under influence of dextrarotatory light gives (+) diethyl tartaric acid.



— Here, 2,4,6-trinitrostilbene, on reaction with bromine, gives (+) dextro-isomer.

— This asymmetric synthesis is required bcoz any one enantiomer out of the racemic mixture is more effective than the other.

so, for better and improved biological activity this is necessary.
 Ex Letrofloxacin, Letrocetazine, (+) ethambutol, penicillin are more effective enantiomers.