M. Sc. Sem. I | Date: 13.07.20

CC - III

Organic chemistry.

Unit : II

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Stereochemistry

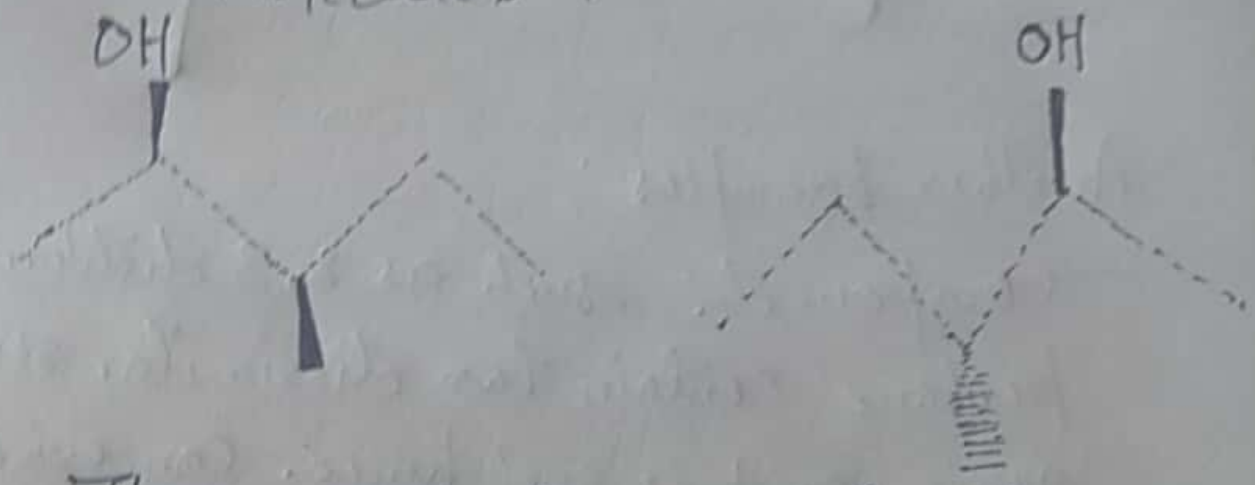
Topic : Diastereomers :

Diastereomers are stereomers that are not mirror images of one another and are non superimposable one another. Stereoisomers with two or more stereocentres can be diastereomers. It is sometimes difficult to determine whether or not two molecules are diastereomers.

For introductory purposes, simple molecules will be used as examples.

More complex examples will be give later.

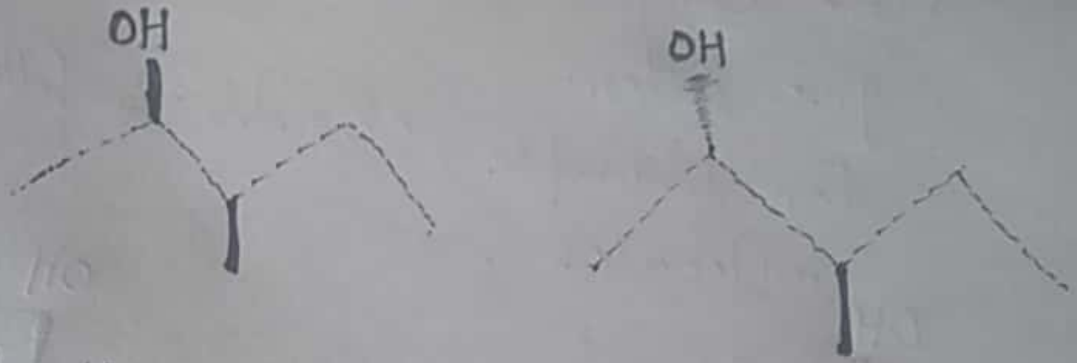
For Example, consider the following molecules.



These molecules are not mirror images of one another. Additionally, these molecules are non-superimposable because if one of these molecules is flipped 180 degrees. (So that the alcohols and methyls are aligned, as shown below),

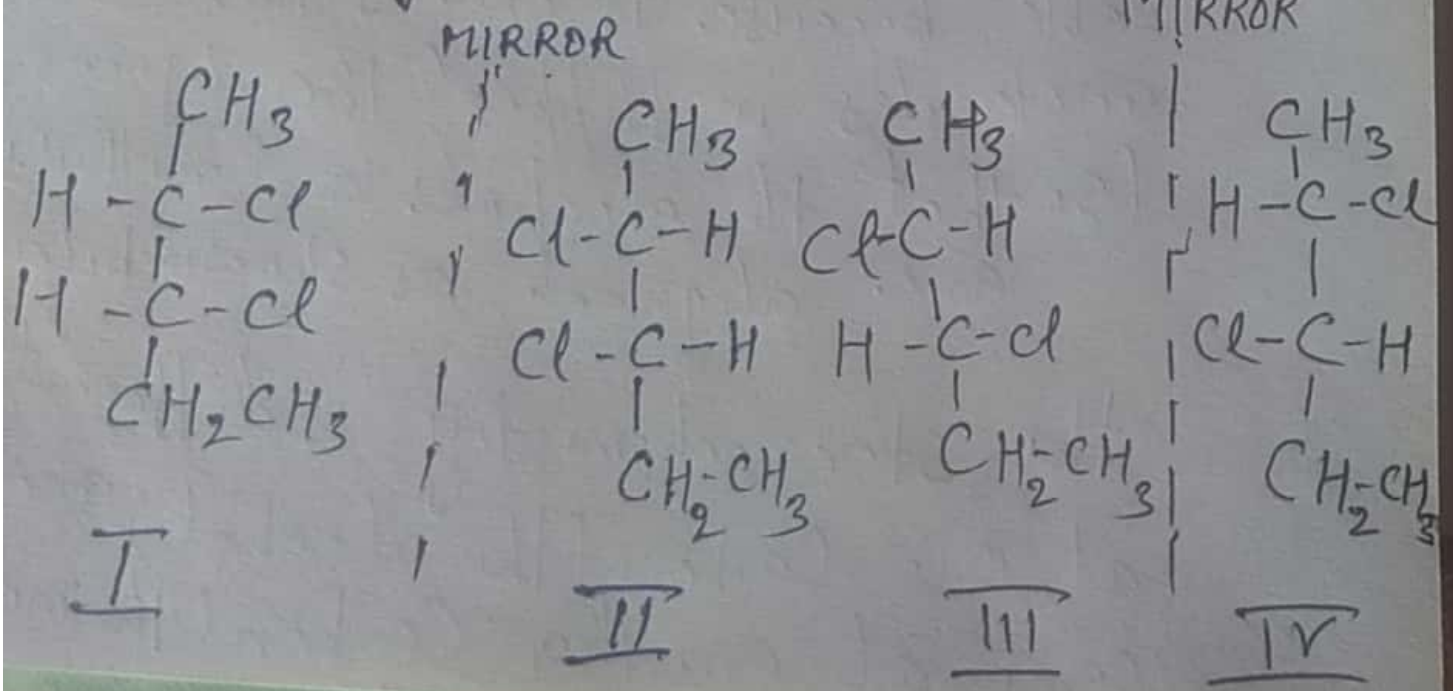
the stereochemistry is different at one Carbon (the alcohol) and the same at another Carbon (the methyls)

Therefore, these molecules are diastereomers.



Another Examples :

compounds such as 2,3 dichloro-pentane contain two dissimilar stereogenic centres and hence can exist in four stereoisomeric forms, i.e., I, II, III and IV which are all optically active.



Stereoisomers, structure I and II, are non-superimposable mirror-images of each other and hence represent a pair of enantiomers. One is dextrorotatory while the other is laevorotatory. Like-wise, Stereoisomers, III and IV are non-superimposable mirror images of each other and hence represent another pair of enantiomers:- one dextrorotatory and the other laevorotatory. Thus, I and III, I and IV, II and III or II and IV, all represent a pair of diastereomers.