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# STEREOCHEMISTRY

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Lecture-12, Degree-II (H)

## Paper-IV, Chapter-4

### SEQUENCE RULES

Optical Isomerism  
Continue..

- \* The following four rules govern the arrangement of the four different groups around an asymmetric carbon atom.

### Sequence Rule : 1

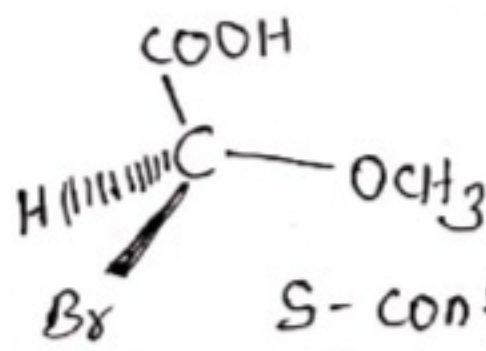
- \* In case all the four atoms directly attached to the asymmetric carbon atoms are different from one another, sequence of priority is determined by their atomic numbers.

The atom of highest atomic no. gets the highest priority while the atom having the lowest atomic number is given the last order of priority.

eg. In Bromomethoxy acetic acid, Priority



≡



$Br > OCH_3 > COOH$

S-configuration

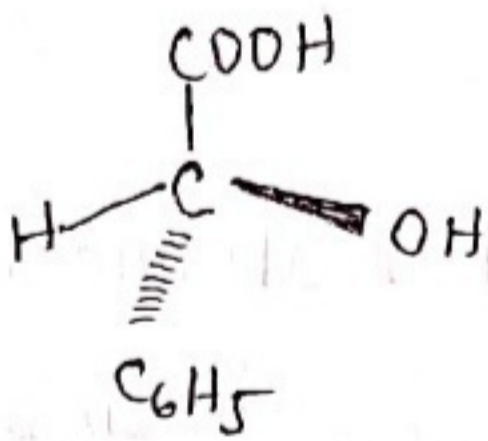
By-Dr.Rinky

- \* In case the asymmetric centre is having two isotopic atoms such as deuterium (D) and hydrogen (H), the isotope of higher mass no. gets higher priority.

## Sequence Rule : 2

- \* If the two atoms directly attached to asymmetric centre have the same atomic number the priority may be determined by comparing the next atom in the group.
- \* If even this does not solve the problem, the comparison is extended to the next atom and so on.

Consider the example of (-)-mandelic acid



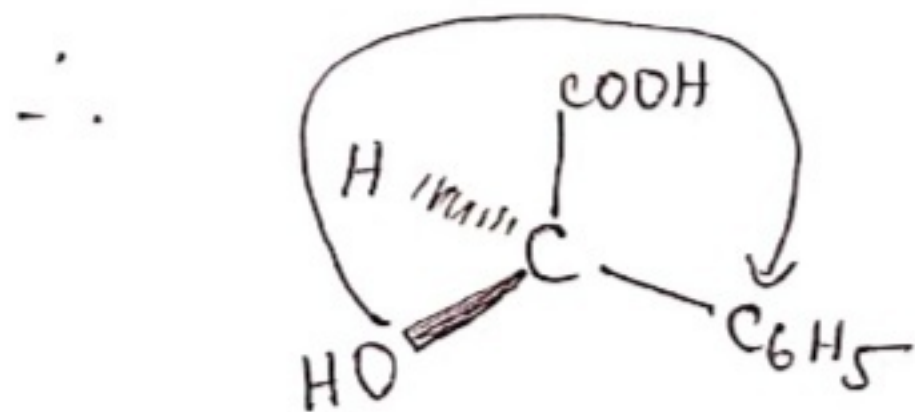
- \* Four groups attached to the chiral carbon are  $-C_6H_5$ ,  $-COOH$ ,  $-OH$  and  $H$ .

- \* In other words, the four atoms attached to the asymmetric carbon atom are C, C, O and H.
- \* The order of priority places  $-OH$  group first and  $H$  in the most remote position whether  $-C_6H_5$  or  $-COOH$  will have higher priority?

gn  $-C_6H_5 \Rightarrow$  2<sup>nd</sup> atom is carbon.

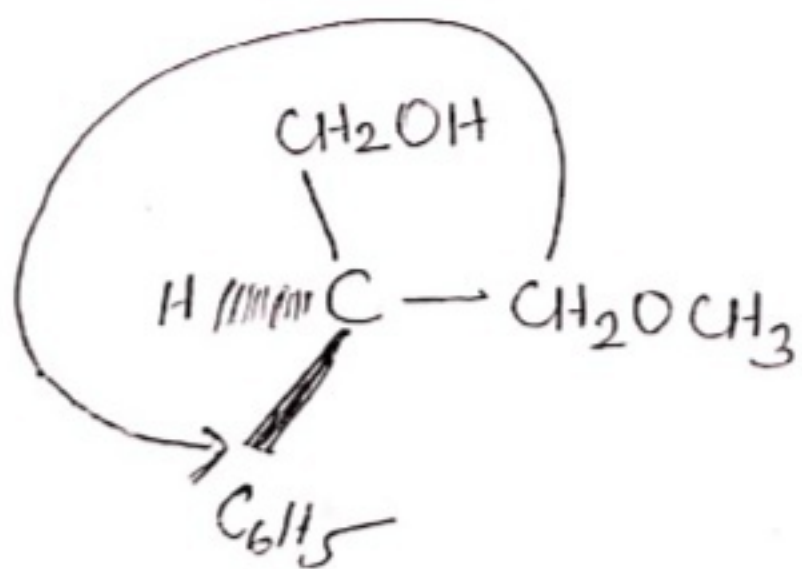
gn  $-COOH \Rightarrow$  2<sup>nd</sup> atom is oxygen.

thus priority of  $-COOH > -C_6H_5$



$[R]$ -(-) mandelic acid

Consider 3-methoxy-2-phenylpropanol which requires examination of the third atoms from the asymmetric carbon atom with two groups.



Priority

$CH_2OCH_3 > CH_2OH > C_6H_5$

$[S]$ -3-methoxy-2-phenylpropanol.

**To be continued in next lecture..**