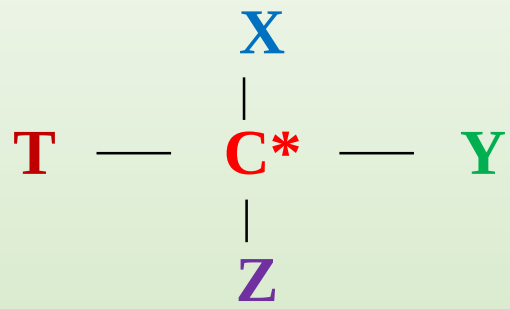
Ch(12) : Enantiomers

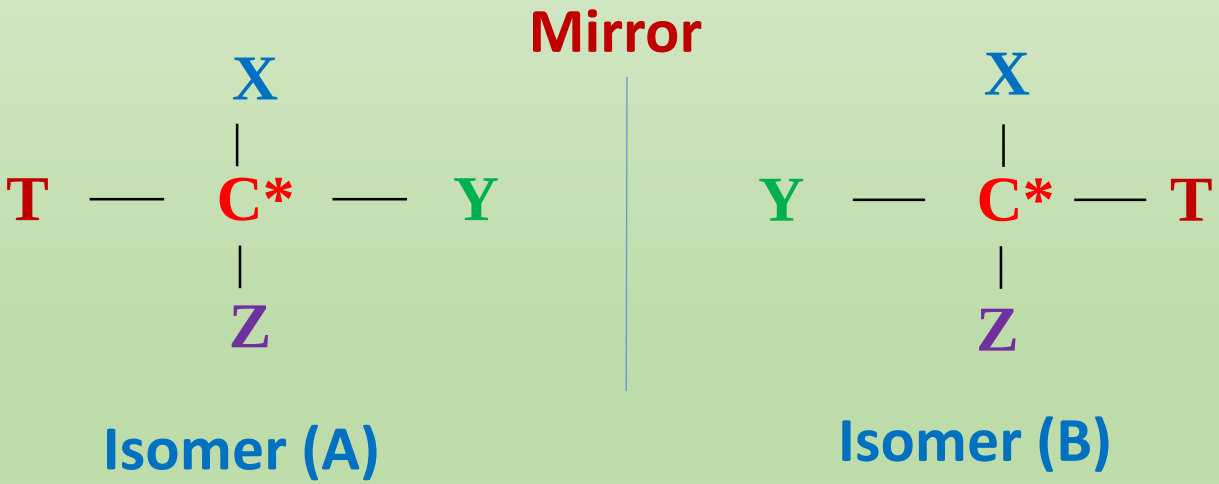
I- Asymmetric carbon and enantiomers

A carbon atom is said to be asymmetric when it is attached to **4 different** atoms or group of atoms.

An asymmetric carbon is represented by C*:

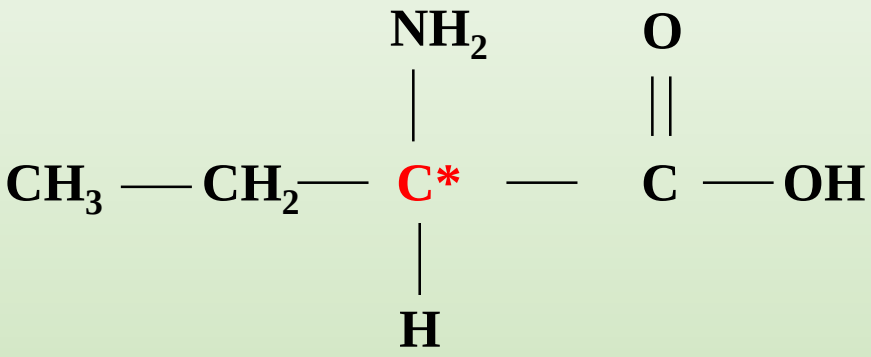


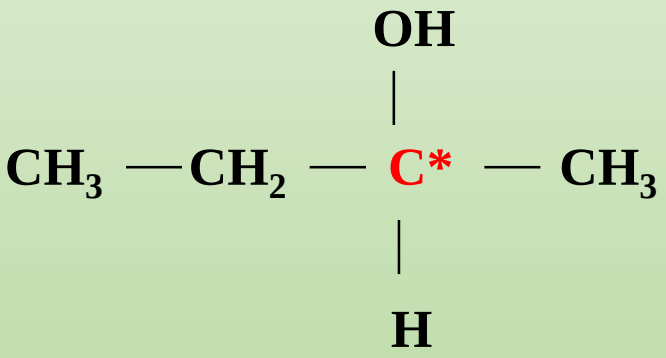
A molecule is called chiral if it contains at least one asymmetric carbon(C*).
Each chiral molecule has two isomers called enantiomers.

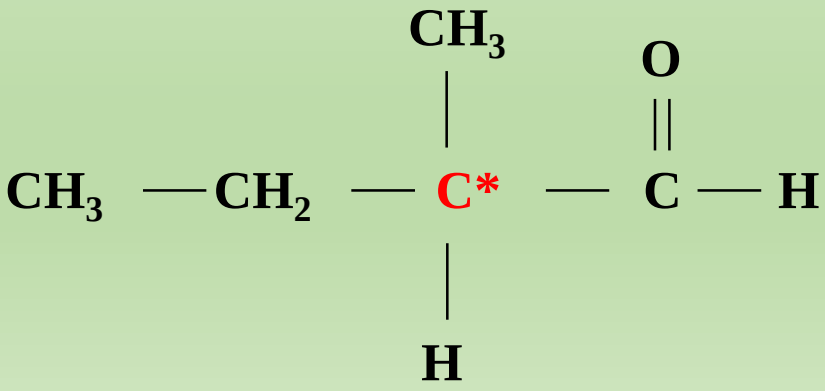


Each one of the isomers (A) and (B) is a mirror image to the other one but they have different chemical and physical properties, they are called enantiomers.

Examples of molecules containing asymmetric carbon (C*) :



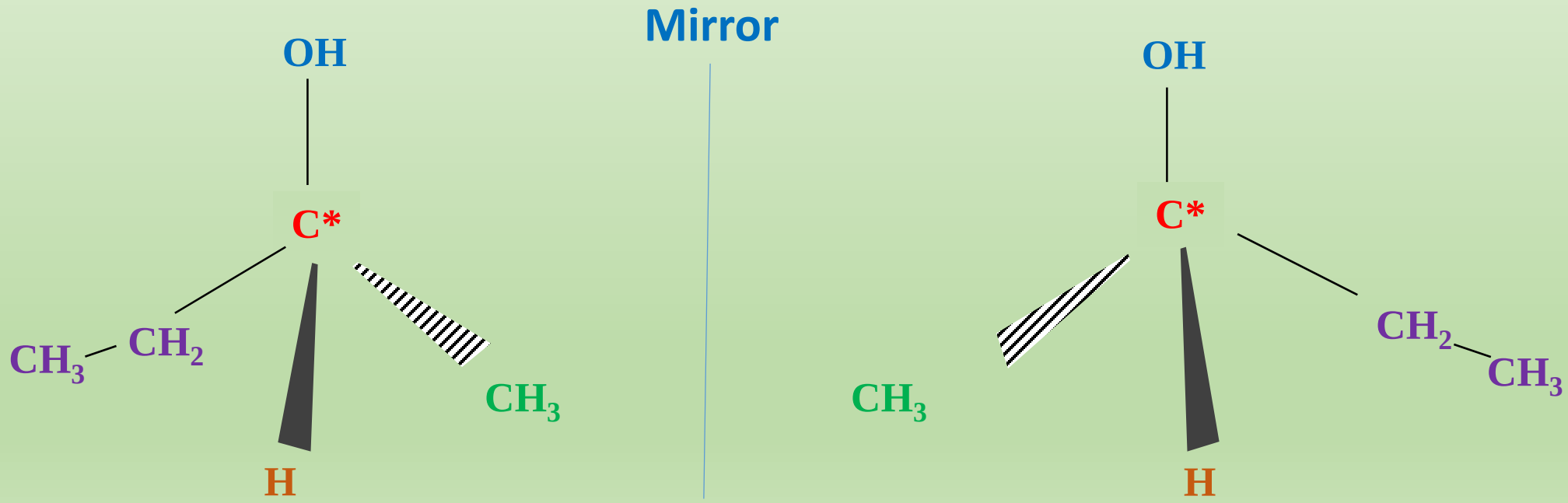




II- Three dimensional representation of the enantiomers (Cram representation)

Example : how to write the Cram representation of the two enantiomers of 2-butanol (consists of C*)?

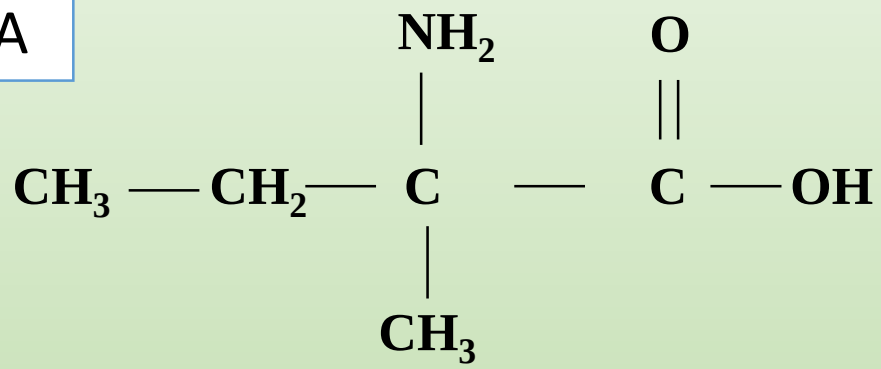
The Cram representation of the two enantiomers is the following:



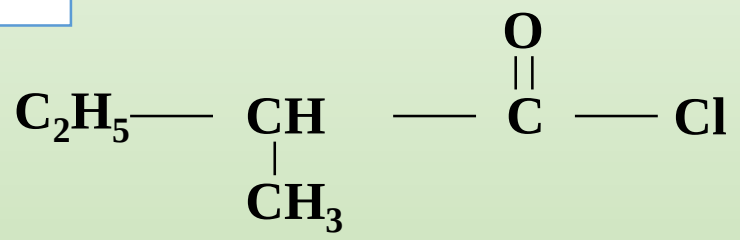
Application

For each of the following molecules, indicate the asymmetric carbon(C*) then write the Cram representation of the two enantiomers.

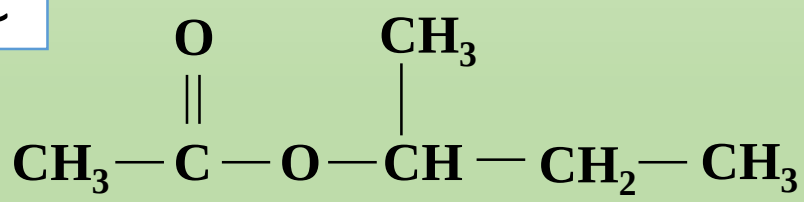
A



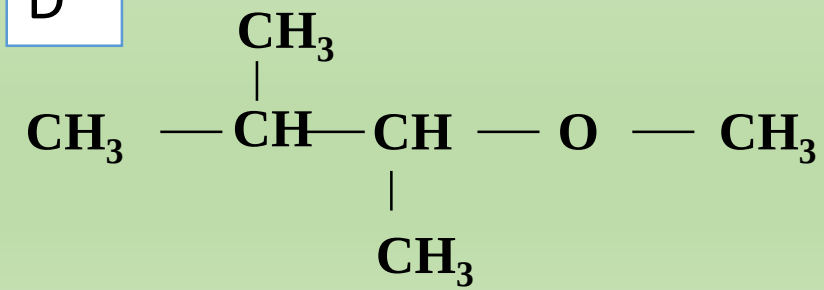
B



C

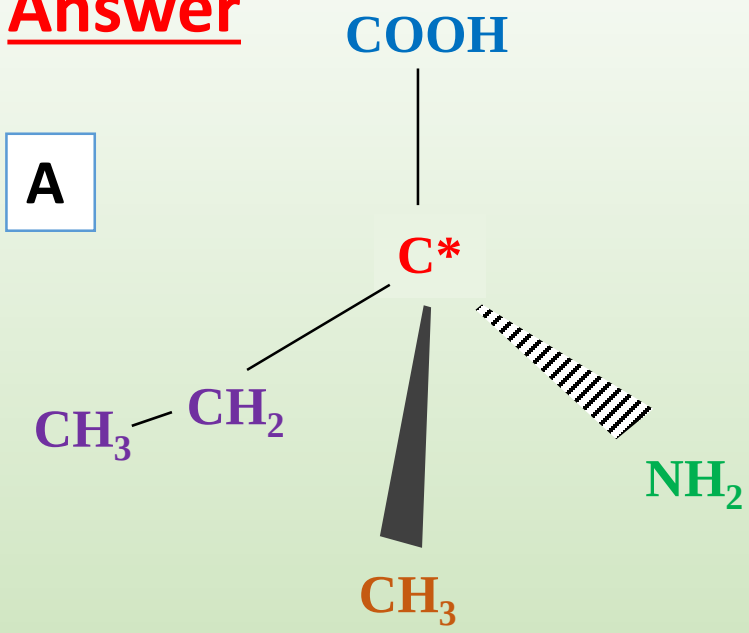


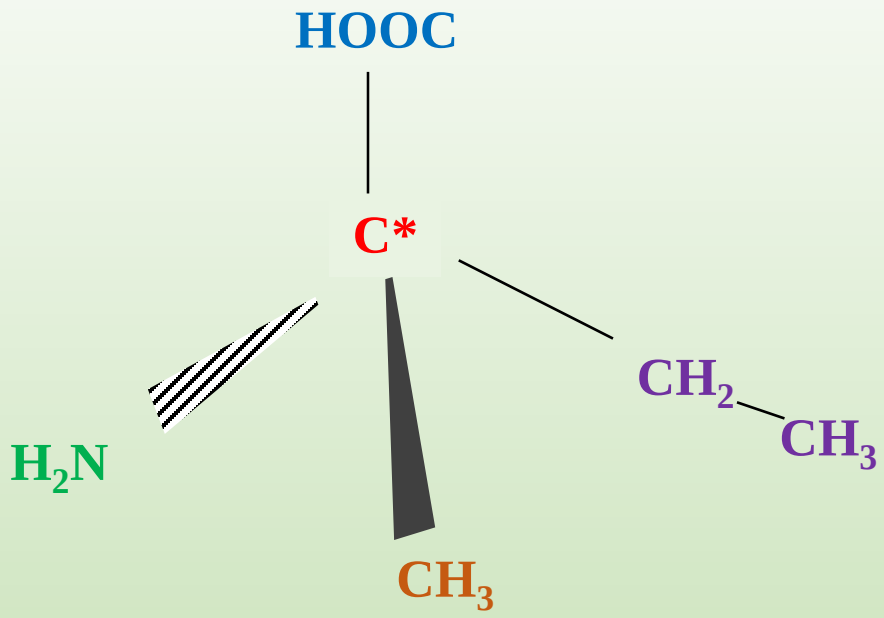
D



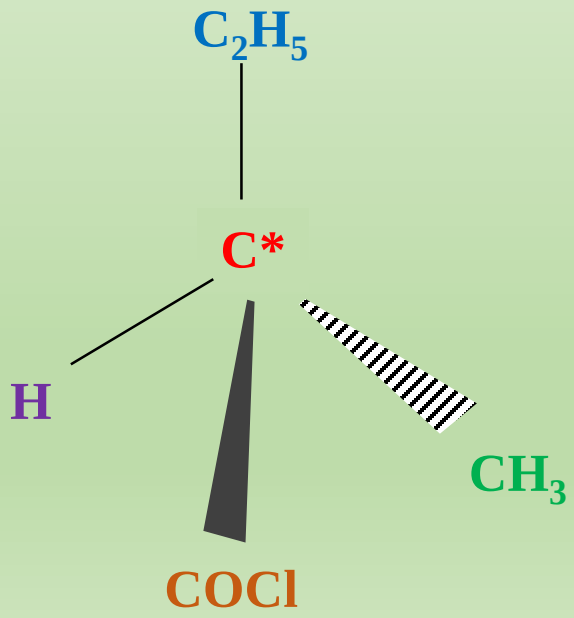
Answer

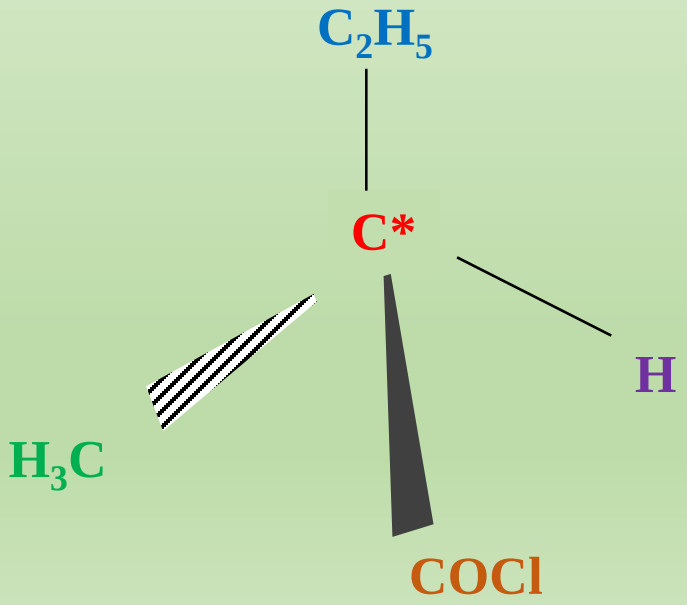
A


COOH
C*
CH3
CH2
NH2
CH3

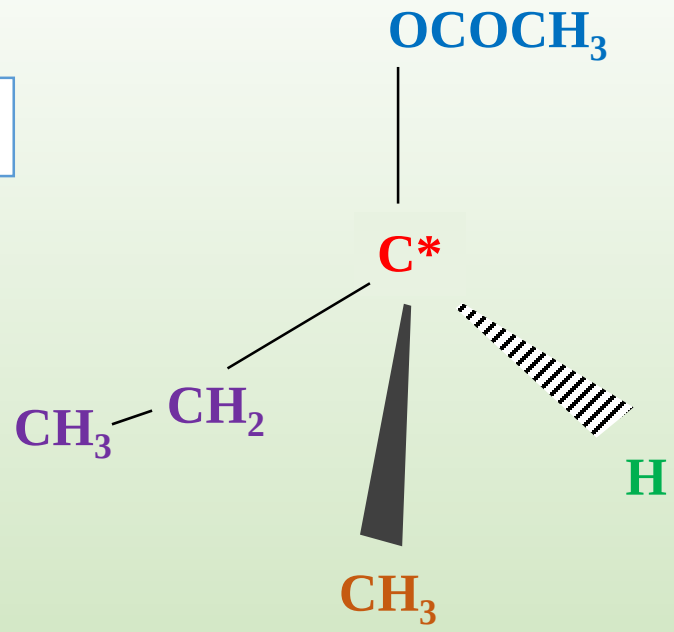

HOOC
C*
H2N
CH2
CH3
CH3

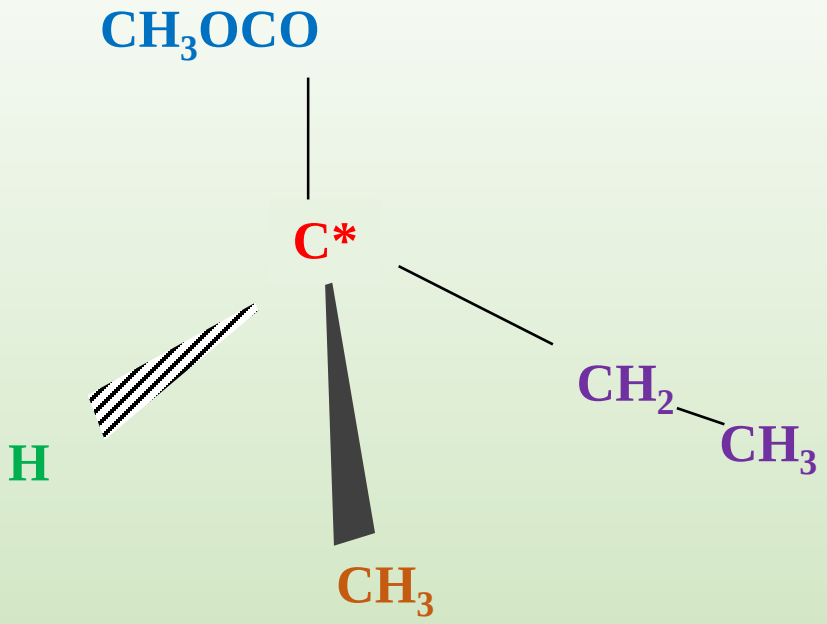
B


C2H5
C*
H
CH3
COCl

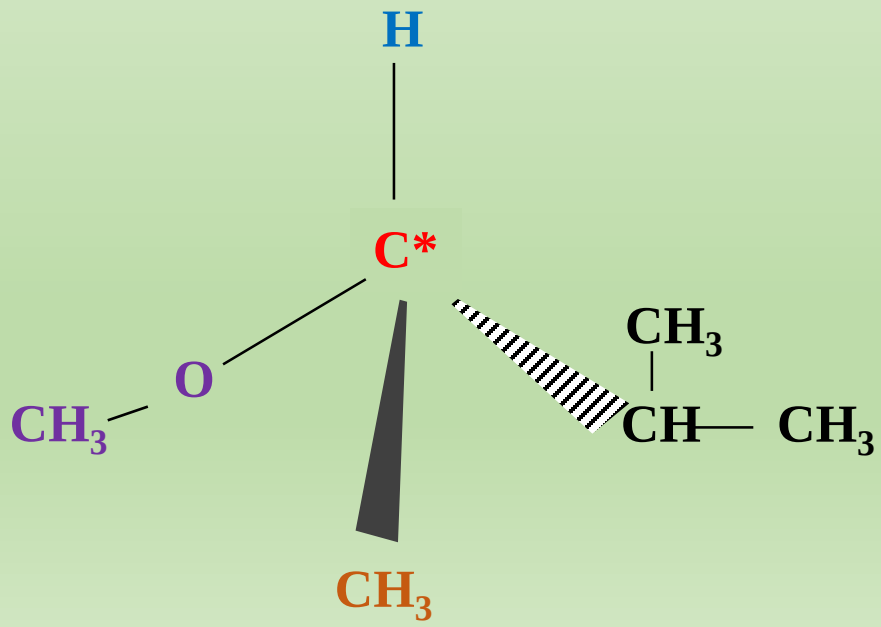

C2H5
C*
H3C
H
COCl

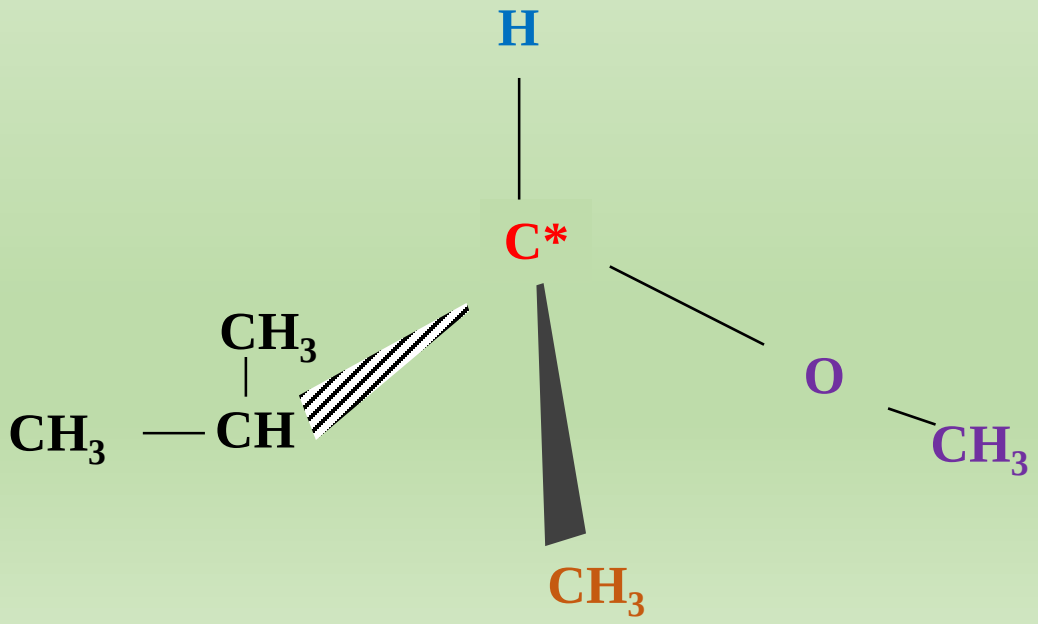
C


OCOCH3
C*
CH3
CH2
H
CH3


CH3OCO
C*
H
CH2
CH3
CH3

D


H
C*
O
CH3
CH3
CH
CH3
CH3


H
C*
CH3
CH3
CH
O
CH3
CH3