

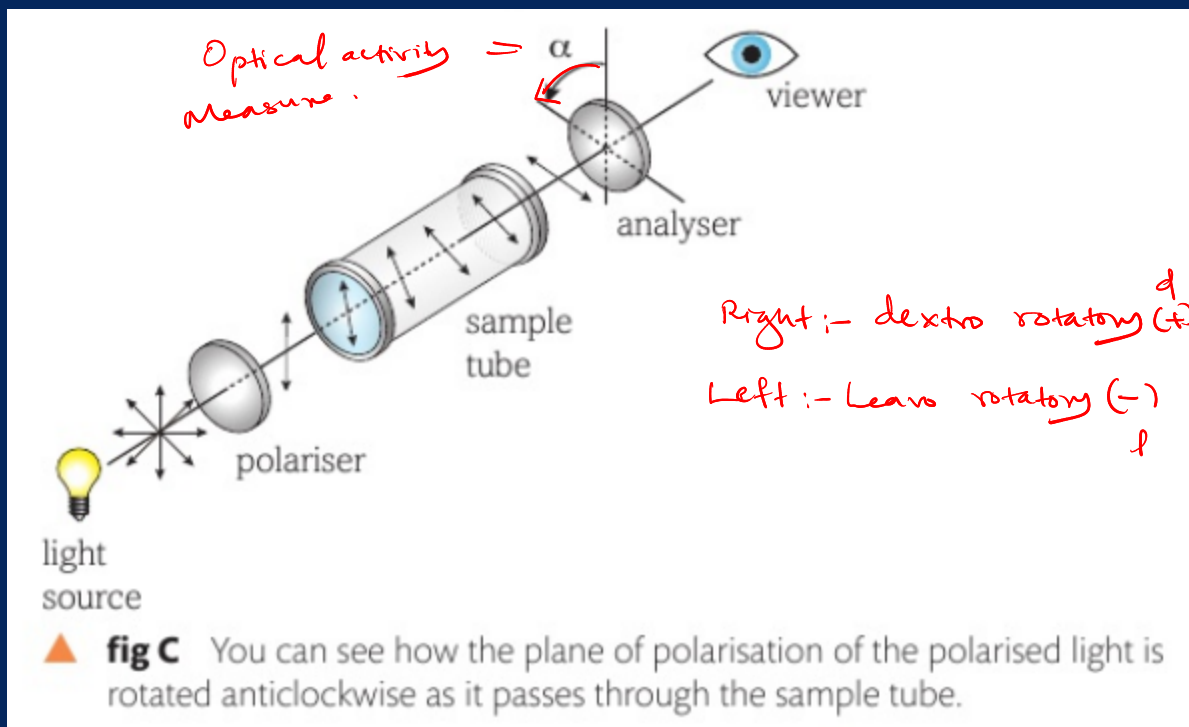
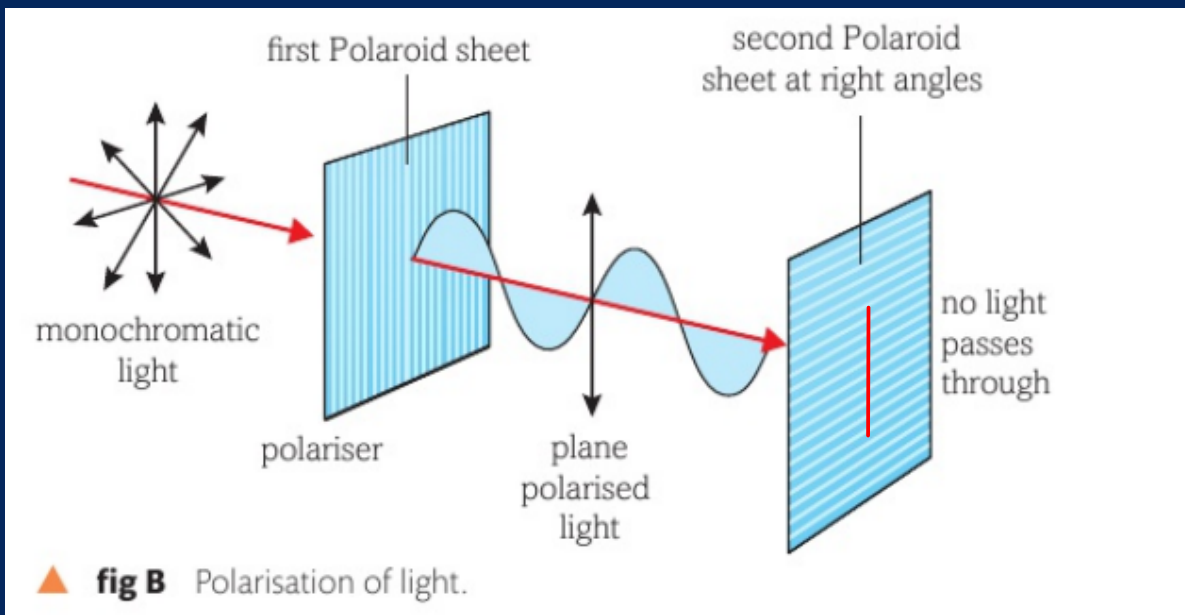
Isomerism

- 1. structural
 - chain
 - Position
 - Functional

- 2. Stereo Isomerism
 - Geometric Isomers
 - a) cis-trans
 - b) E-Z
 - Optical Isomerism.

stereo isomerism :- Similar molecular formulae but different spatial arrangement

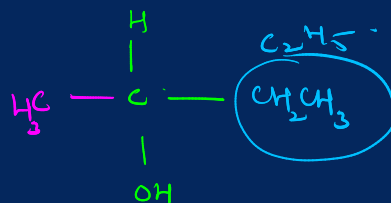
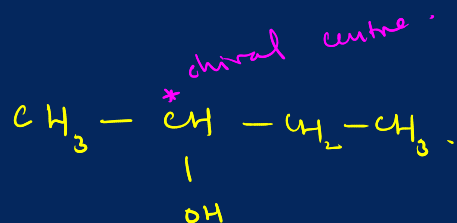
Optical isomers - are compounds they rotates the plane of plane polarised light either in clockwise direction or in anticlockwise direction



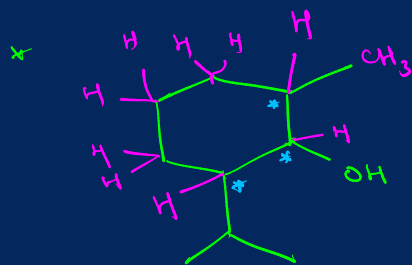
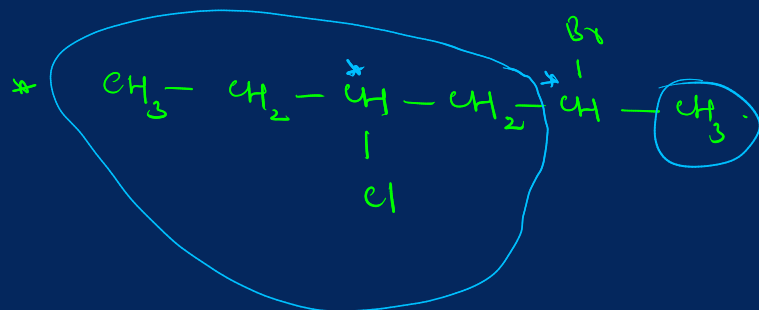
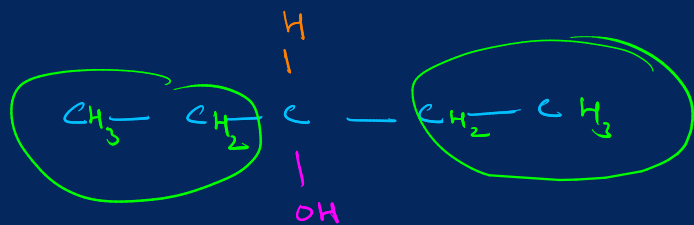
The compounds rotates the plane of plane polarized light is known as optically active compounds / chiral compound.

Conditions to become chiral or optically active :

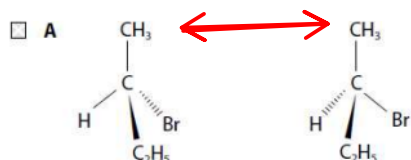
1. All the four substituent / bonds C - should connect to four different atom / group of atoms.
2. No plane of symmetry in the compound.



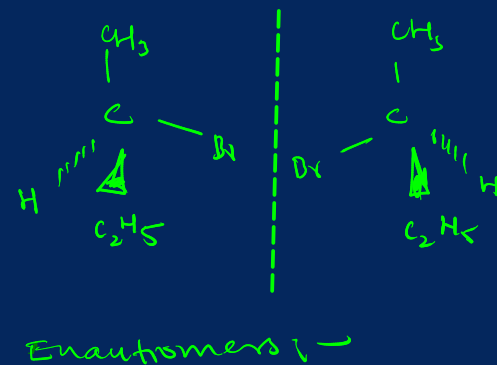
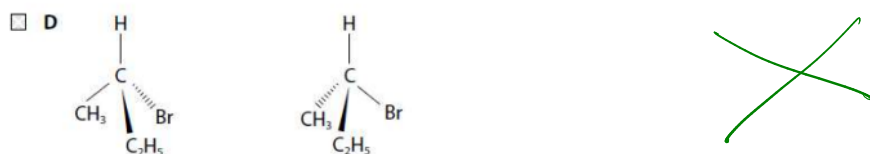
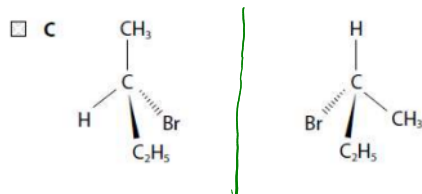
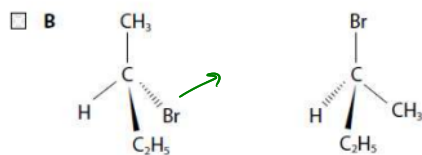
* Propan-3-ol :- Not optically active.



When mixed in equimolar quantities, which pair of molecules will **not** rotate the plane of plane-polarised light?

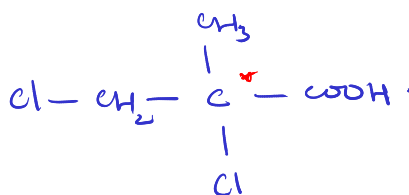


Enantiomers:-
non-super imposable
Mirror Images.



2 Which of these molecules can rotate the plane of plane-polarised light? *chiral*

- A $\text{H}_2\text{NCH}_2\text{COOH}$
 B $\text{HOCH}_2\text{CH}_2\text{COOH}$
 C $\text{ClCH}_2\text{C}(\text{CH}_3)(\text{Cl})\text{COOH}$
 D $\text{H}_2\text{NC}(\text{CH}_3)_2\text{COOH}$

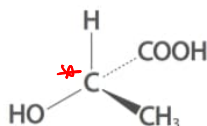


(Total for Question 2 = 1 mark)

17 This question is about carboxylic acids and their derivatives.

(a) Lactic acid, $\text{CH}_3\text{CH}(\text{OH})\text{COOH}$, is produced in muscles as a result of anaerobic respiration.

(i) The structure of lactic acid is



Give a reason why lactic acid shows optical isomerism.

(1)

→ chiral carbon present -
→ four different substituent.

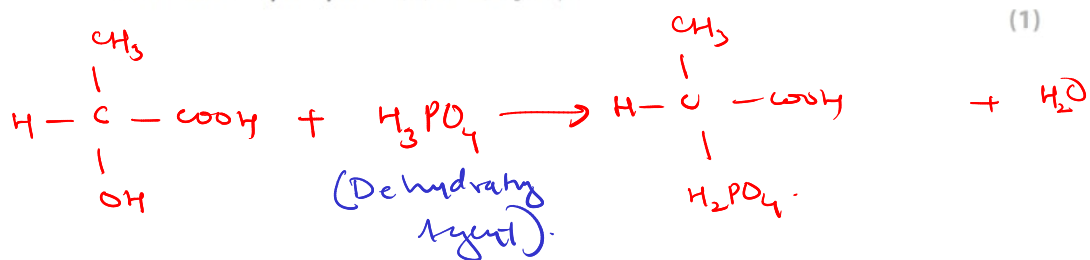
(ii) A laboratory sample of lactic acid does **not** rotate the plane of plane-polarised monochromatic light.

Give a reason for this observation.

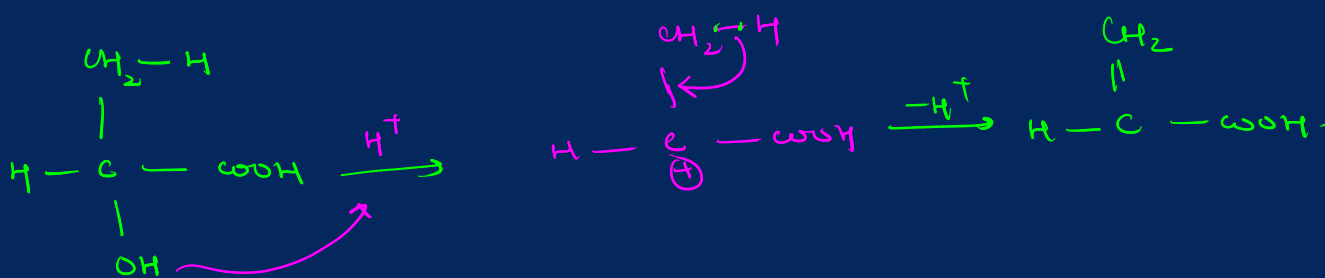
(1)

Racemization:- Equal amount of rotation in
clock wise & anti clock wise direction.

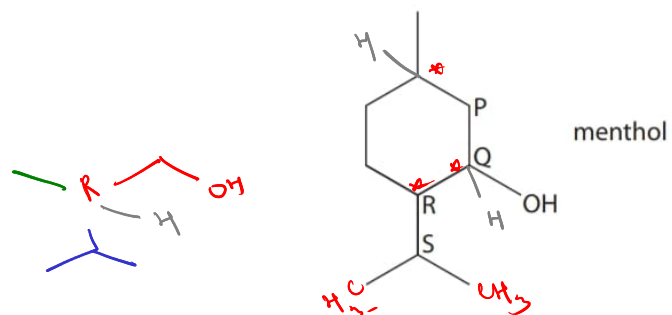
(iii) Give the structure of the organic product formed when lactic acid reacts with concentrated phosphoric(V) acid, H_3PO_4 .



$\text{CH}_2=\text{CH}-\text{COOH}$ (Elimination of H_2O).



8 The compound menthol has the structure shown. Some of the carbon atoms are labelled P, Q, R and S.



(a) What is the number of chiral centres in a molecule of menthol?

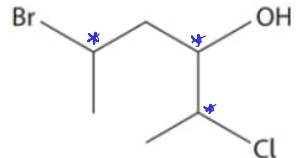
(1)

- A 1
- B 2
- C 3
- D 4

<http://britishstudentroom.wordpress.com/>

13 How many optical isomers does this molecule have?

chiral centre = 3 -



$$2^n = 2^3 = 2 \times 2 \times 2$$

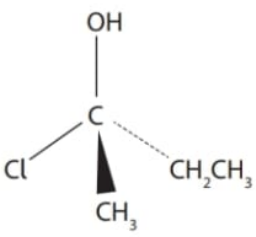
- A 2
- B 3
- C 6
- D 8

= 8

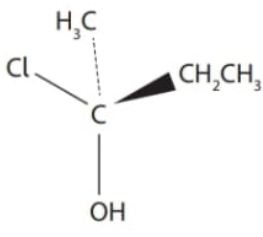
d- 1
 d- 2
 d- 3
 d- 4
 d- 5
 d- 6
 d- 7
 d- 8

(Total for Question 13 = 1 mark)

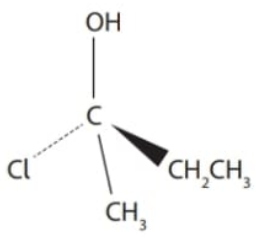
14 Which of these structures is **not** identical to the others?



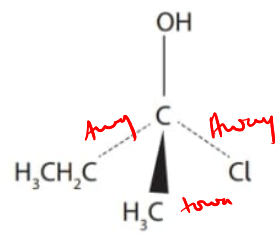
Structure A



Structure B



Structure C



Structure D

- A Structure A
- B Structure B
- C Structure C
- D Structure D

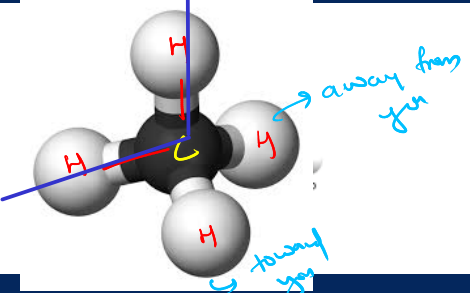
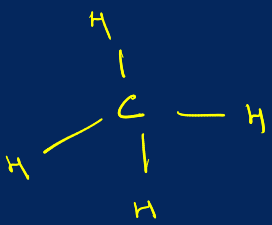
3D



(Total for Question 14 = 1 mark)

TOTAL FOR SECTION A = 20 MARKS

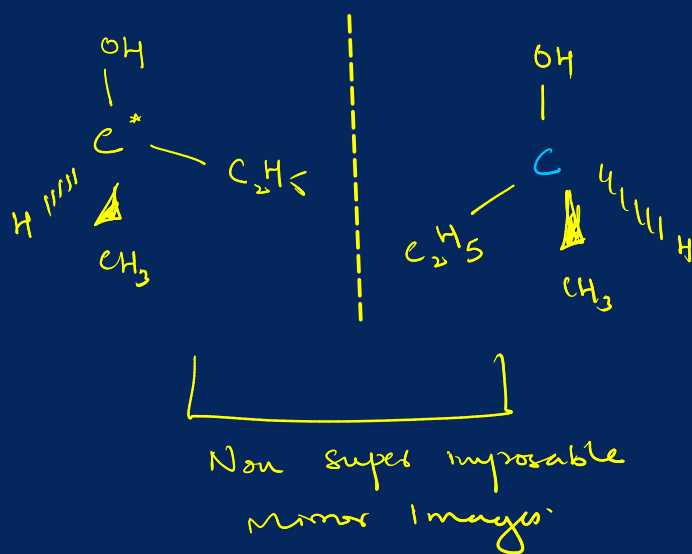
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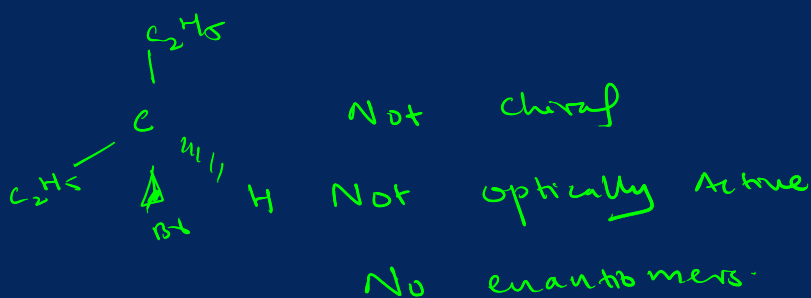
Enantiomerism

Non super imposable mirror images.

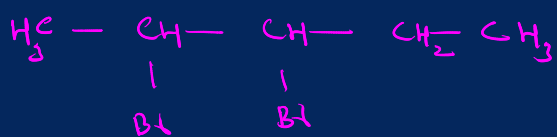
* 2- Butanol.



* 3-bromo pentane -



* 2,3-dibromopentane :-



Recemic mixture :

If the mixture contains equal amount of two enantiomers (dextro and leavo) - ie the recimic mixture; the overall rotation of plane polarized light is zero,

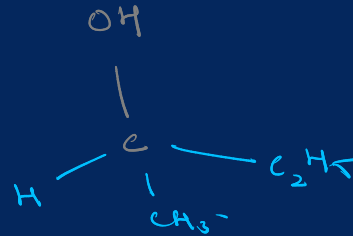
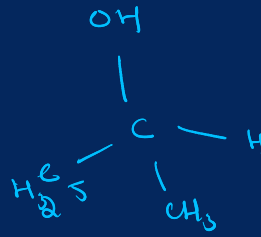
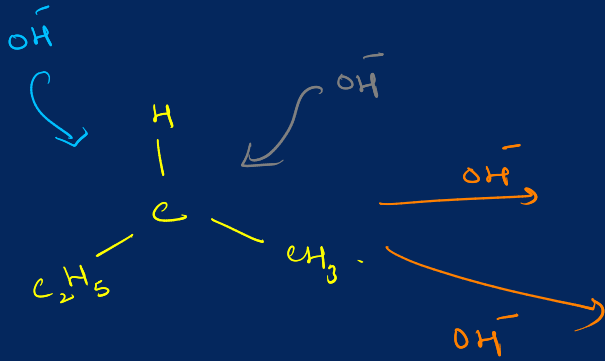
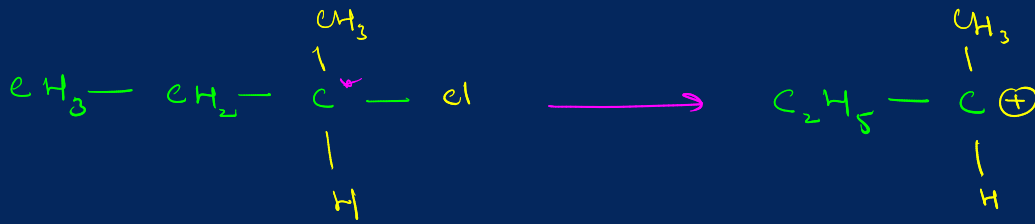
SN1 and SN2 mechanism

SN2 :-



S_N1

for 3° - Halogeno alkane; generally -



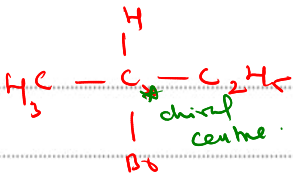
Enantiomers;

may or may not be racemic mixture.

(e) 2-bromobutane can react with aqueous hydroxide ions by an S_N1 mechanism.

Explain why the butan-2-ol produced from a single optical isomer of 2-bromobutane, using this mechanism, is not optically active.

(3)



→ Racemization.

→ Equal amount of two enantiomers.

(iii) When plane-polarised light is passed through an optical isomer, the plane of polarisation is

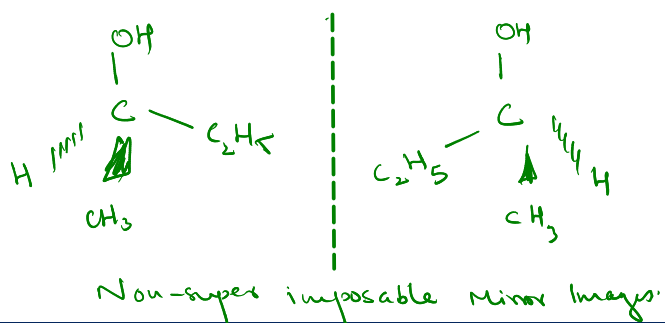
(1)

- A diffracted
- B reflected
- C refracted
- D rotated

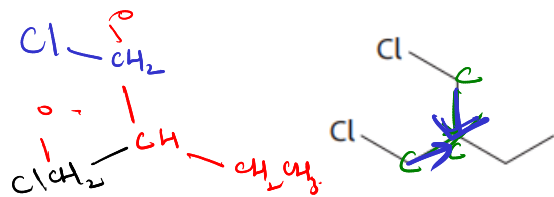
(c) The product of the hydrolysis of 2-bromobutane is butan-2-ol. Both molecules are chiral.

State what is meant by the term chiral, using three-dimensional diagrams of the enantiomers of butan-2-ol to illustrate your answer.

(3)



(b) What is the classification of the dihalogenoalkane shown?



(1)

- A primary
- B secondary
- C tertiary
- D primary and secondary

(Total for Question 3 = 5 marks)

