OC SHEET SOLUTION

Stereoisomerism

Team
OC
Allen
Kota

Solution (Ex. 1)

Sol. (1)

V and X are Geometrical isomer

Y and Z are Geometrical isomer

X and Y are Structure (Constitutional) isomer

V and Y are Constitutional isomer

Ans C is correct.

Sol (2)

$CH_2=CH-Cl$ has no isomer

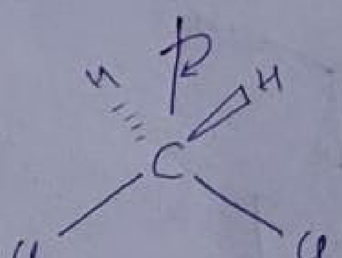
But $CH_3CH_2CH_2Cl$ can have $CH_3-\underset{|}{\overset{Cl}{C}}H-CH_3$

CH_3-CHO can have $CH_2=\overset{OH}{\overset{|}{C}}H$

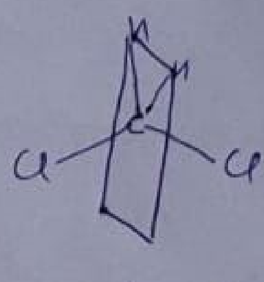
$ClCH_2CH_2Cl$ can have $CH_3CH{<}^{Cl}_{Cl}$

Ans C is correct

Sol (3)

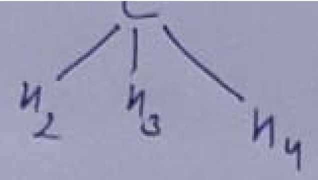


C_2 Axis of Symmetry is present



Plane of Symmetry is present.

Ans D is correct.



Six plane of Symmetry

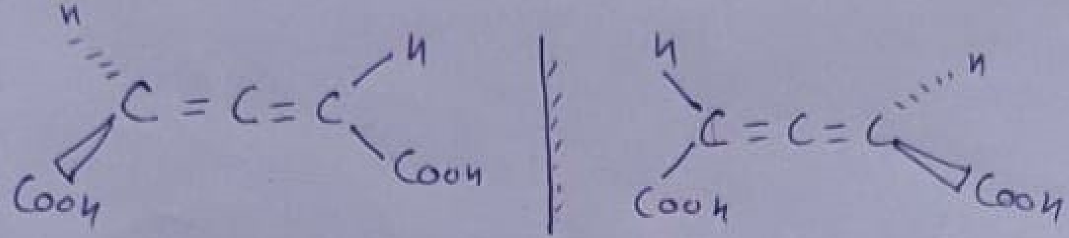
H_1CH_2 H_2CH_3 Plane Passing through

H_1CH_3 H_2CH_4

H_1CH_4 H_3CH_4

(D) is correct

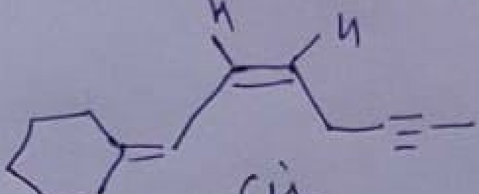
Sol (5)



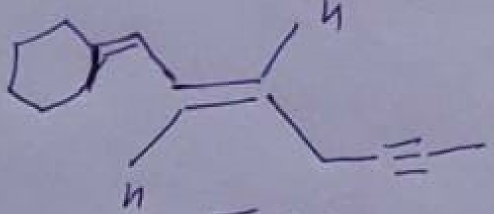
Two optical isomers

(A) is correct.

Sol (6) 2 Cis - Trans is possible.



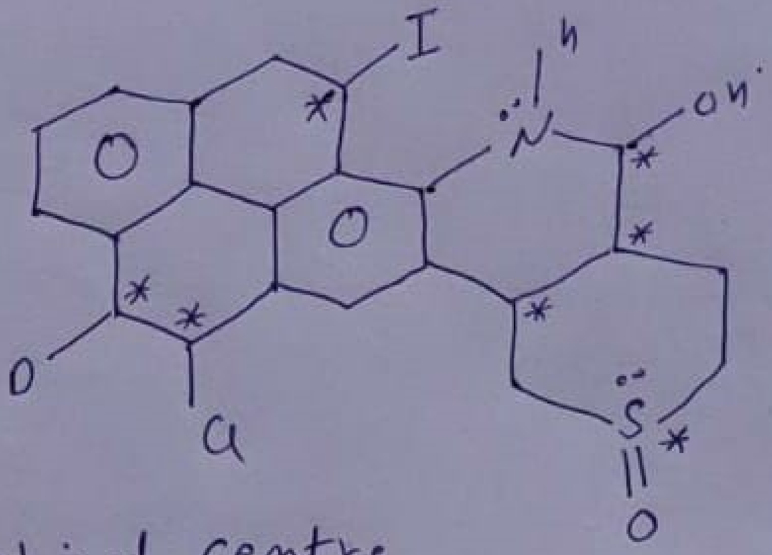
Cis



Trans

(A) is correct.

Sol (7)



7 Chiral centre

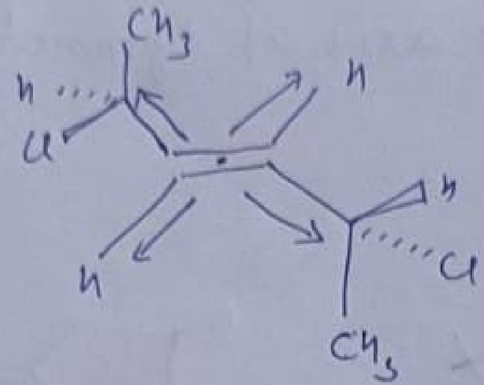
(A) is correct.

Sol^n (8) Position of OH group is different.

$\therefore$ Structure (Constitutional) isomer

Ans (D) is Correct

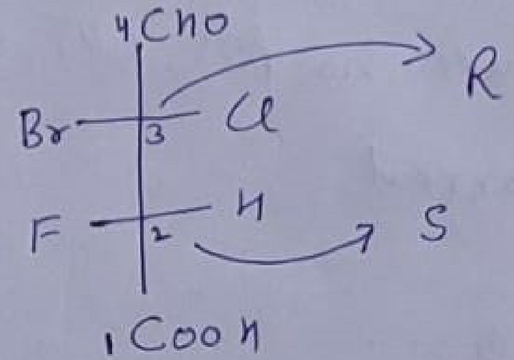
Sol^n (10)



Centre of Symmetry is present.

Ans (B) is Correct.

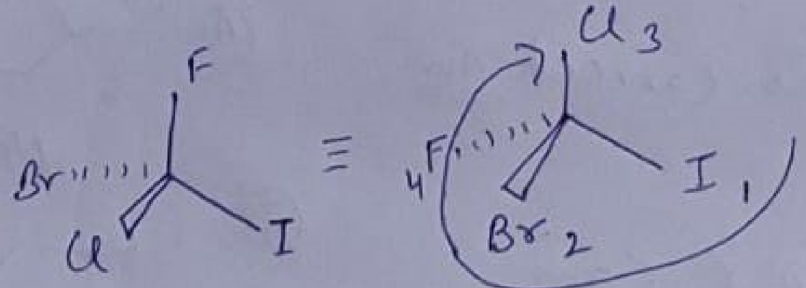
Sol (11)



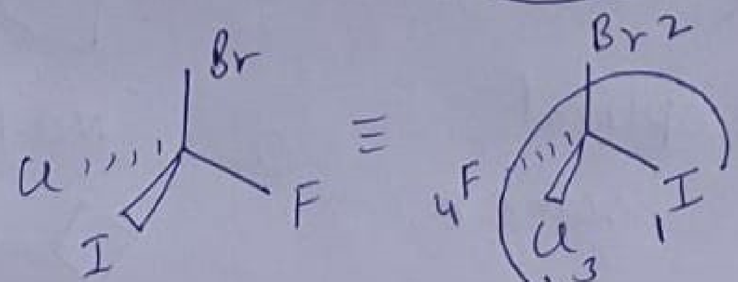
$\therefore$ (2S, 3R)

(D) is Correct

Sol (12)



Clockwise (R)



Anticlockwise S

(A) is Correct.

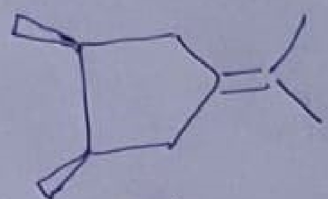
Sol (14)

(I), (IV) have Centre of Symmetry and (iii) have Plane of Symmetry

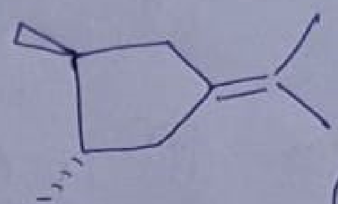
(II) have no Plane of Symmetry, no centre of Symmetry and no Alternate axis of Symmetry.

(B) is correct

Sol (15)



Cis

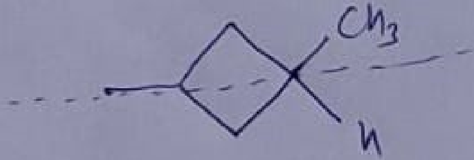


Trans (Optically Active)

Trans have no POS, COS and AAOS.

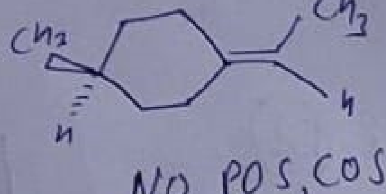
∴ (C) is correct

Sol (16)



POS is present.

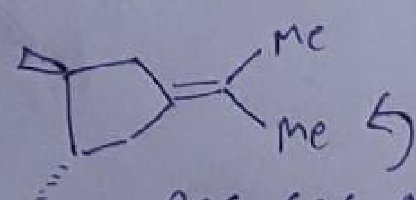
(A)



(D) is correct Ans

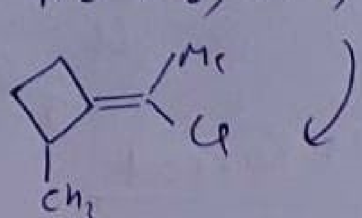
NO POS, COS, AAOS

(B)



NO POS, COS, AAOS

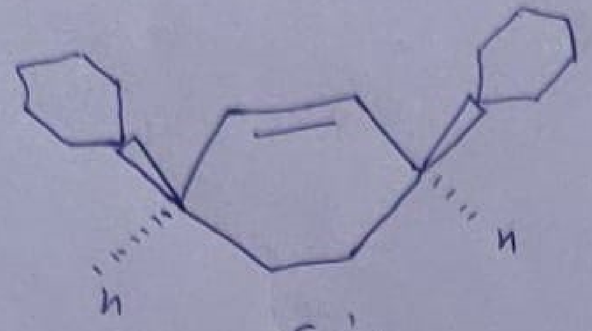
(C)



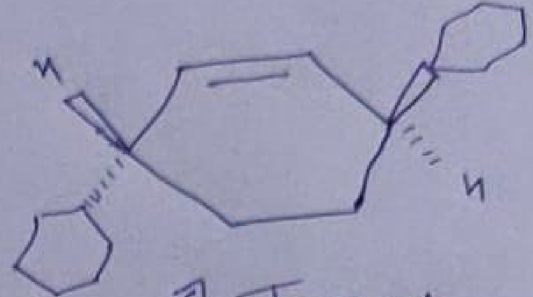
∴ A, B, C can show optical isomer.

Solⁿ (17)

(C) can show both G.I and optical isomer



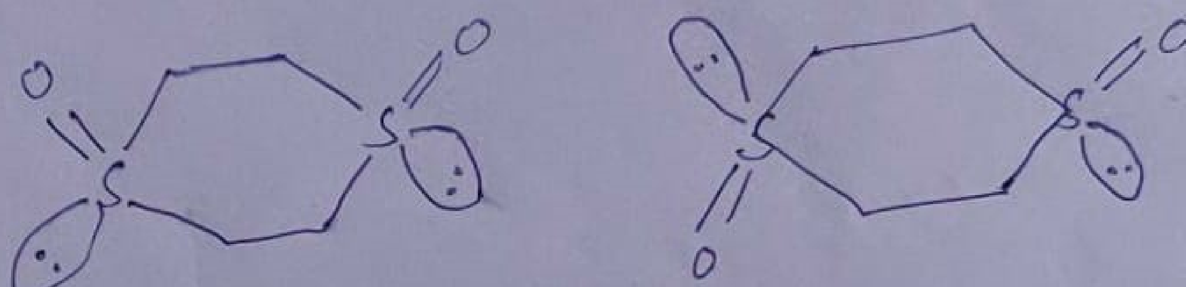
Cis



Trans.
(optically Active)

(C) is correct Ans.

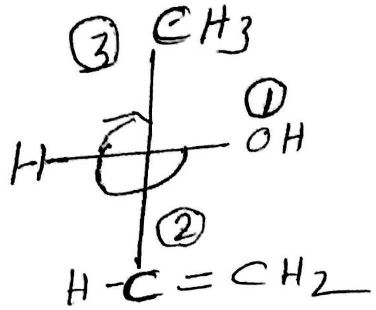
Solⁿ (19)



Geometrical isomer.

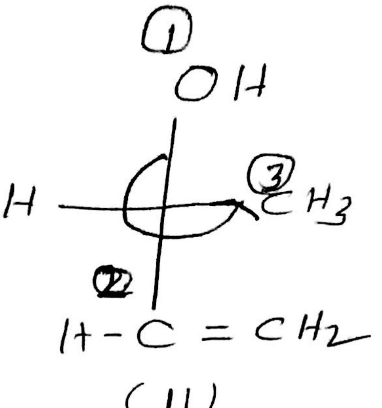
(A) is correct Ans.

Q. (22) - Ans - [C]



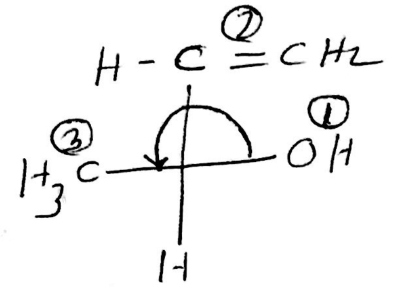
(I)

S



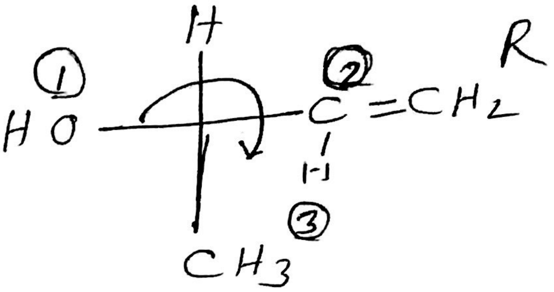
(II)

R



(III)

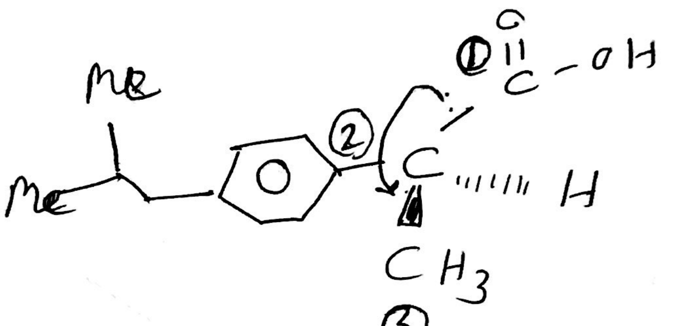
S



(IV)

R

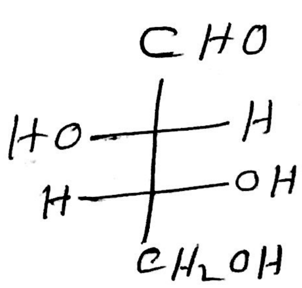
Q (23) Ans - [D]



S

Q (24) Ans - [B]

Threo- Higher priority groups opposite side.

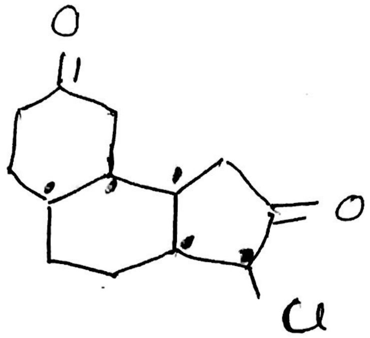


Q (26)   Ans (B).

D-Sugar – At last chiral carbon –OH group on Rhight side.

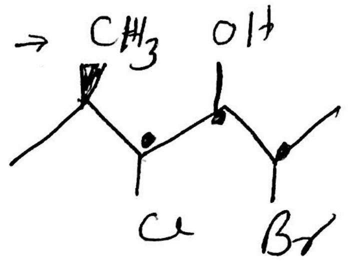
Q (27).   Ans [B]

[X] →



Chiral Center = 5
(a)

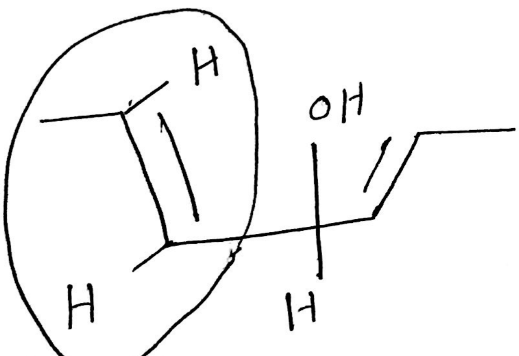
[Y] →



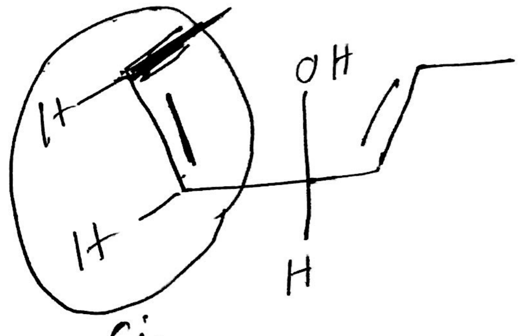
Chiral Center = 3
(b)

[a − b] = [5 − 3]
= 2

Q (30)   Ans - [C]



trans



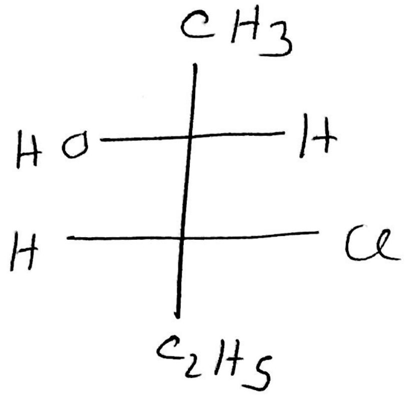
Cis

(a) Both are G I ✓

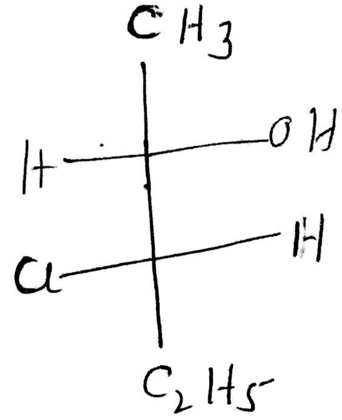
G I are sterioisomer ✓

G I are diasteriomers ✓

Q-(32)



(I)



(III)

(I) and (III) are mirror image of each other
So they represents pair of enantiomers.

Ans [C]

Q (36) - Ans - [C]

given $d = 75\%$

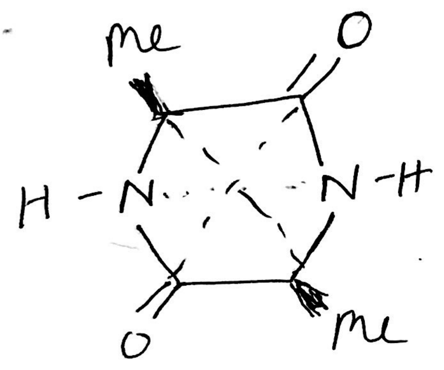
So $l = 25\%$

$$E.E = \frac{d-l}{d+l} \times 100$$

$$= \frac{75-25}{100} \times 100$$

$$= 50\%$$

Q.(37). Ans - [A]

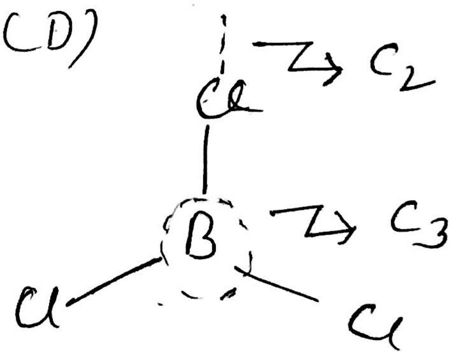


COS is Present ✓

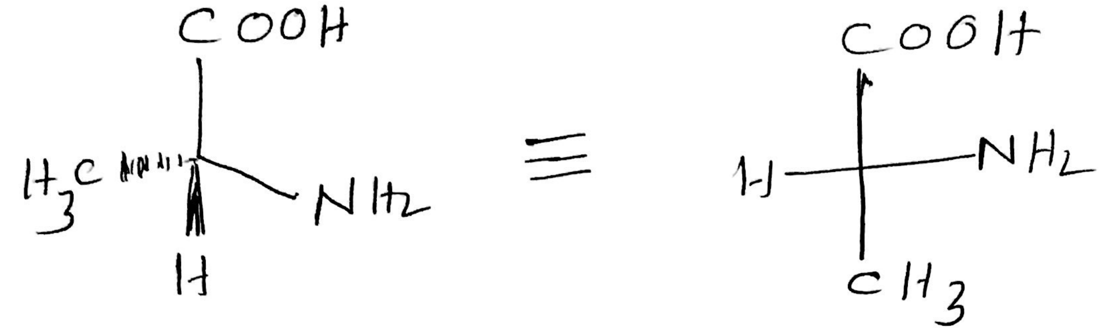
Meso ✓

opt inactive

Q (38) - Ans. (D)

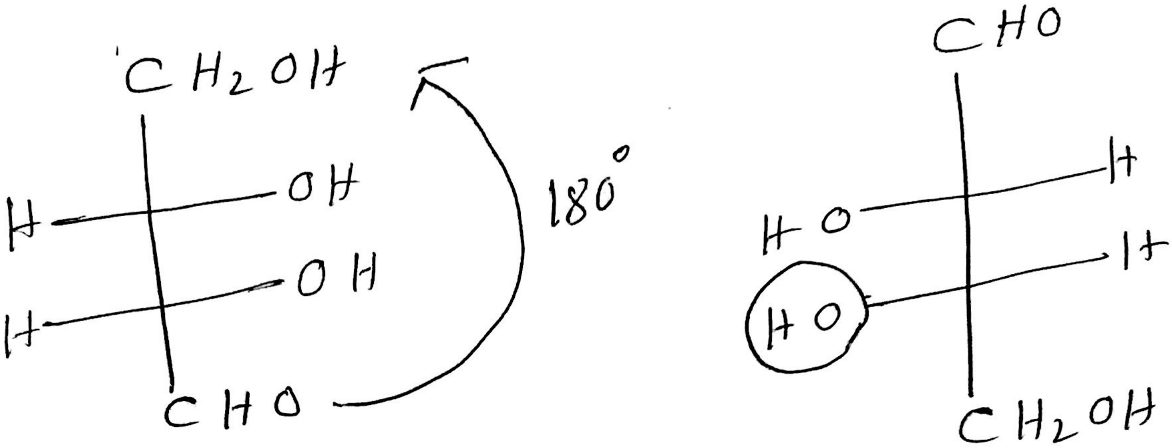


Q.(39). Ans → [C]



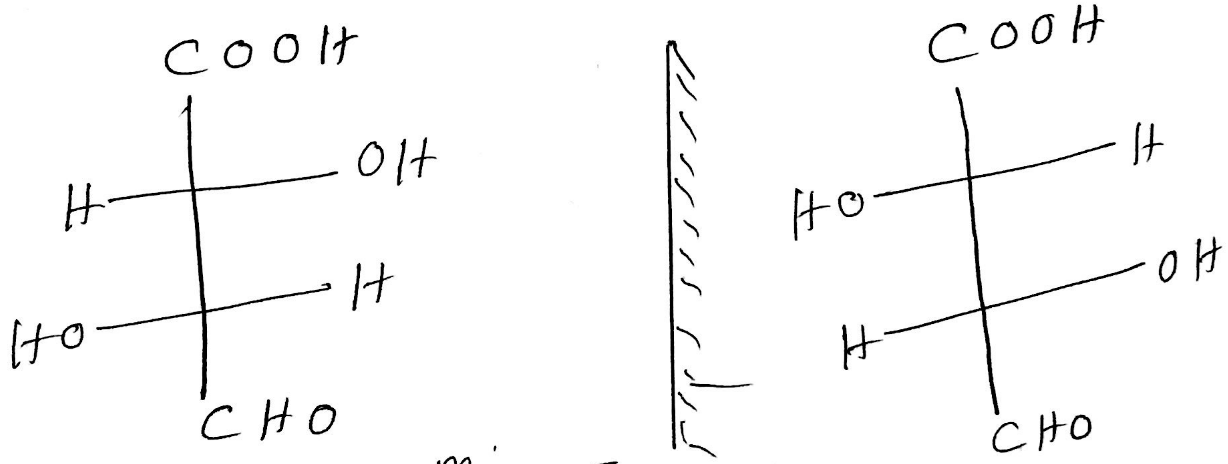
Amino Acid

D - form



L - form

Q (40)- Ans - [A].



Mirro Image → So Enantiomer

① $C_5H_{10}O$ = D.U ⇒ 1

n. of aldehyde

① $CH_3-CH_2-CH_2-CH_2-CHO$

② $CH_3-CH-CH(CH_3)-CHO$

③ $CH_3-\overset{*}{C}H(CH_3)-CH_2-CHO$ ②

④ $CH_3-C(CH_3)(CH_3)-CHO$

TOTAL Aldehyde = 5

n. of Keton

① $CH_3-CH_2-CH-C(=O)-CH_3$

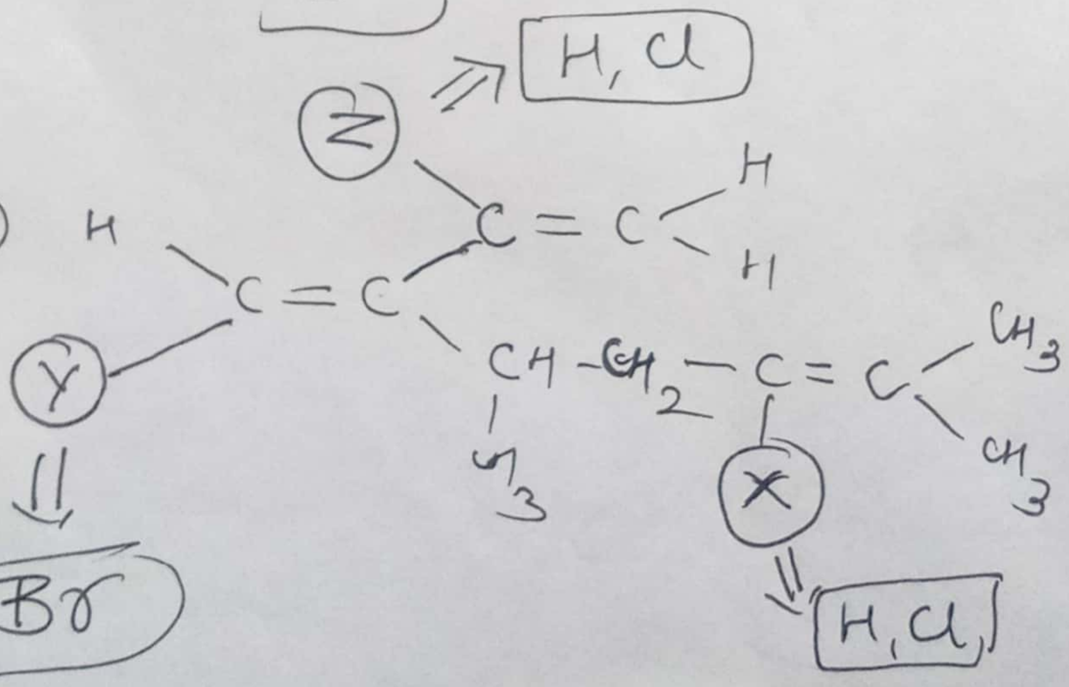
② $CH_3-CH(CH_3)-C(=O)-CH_3$

③ $CH_3-CH_2-C(=O)-CH_2-CH_3$

TOTAL Keton = 3

Ans ⇒ $\boxed{B}$

②



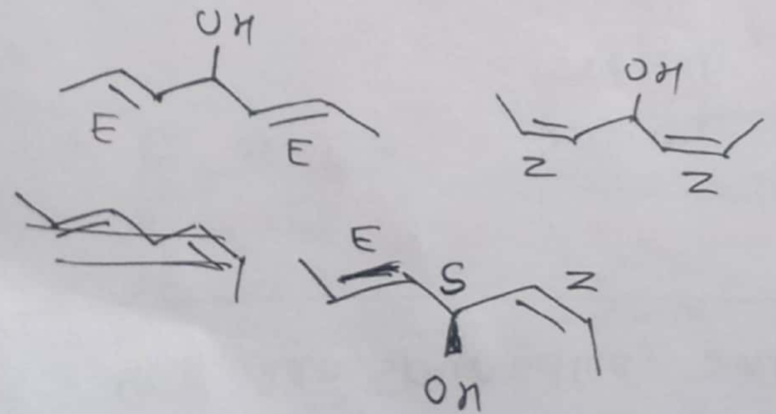
Solution ⇒ $\boxed{C}$

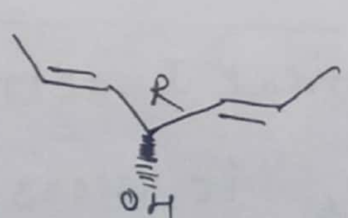
(Z) and (X) Ca containing alkene cannot show G.I in which (xyC=Cxy)
X,Y are same, only Y-containing alkene can show G-I. So wrt given question Y must Be Br,

(3) $\boxed{B}$ Single chiral carbon always optical active

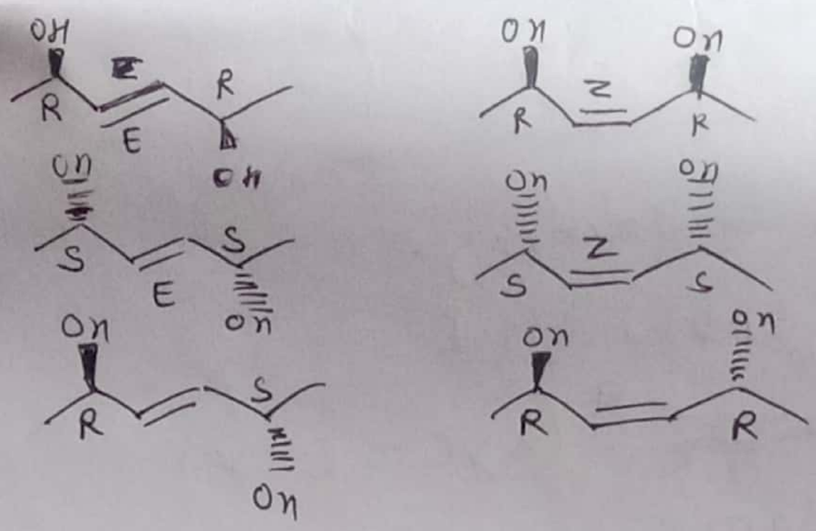
Sol^n and all optical active compounds are "resolvable", and optical active compound are non superimposable on its mirror image.

(4)





Total = 4

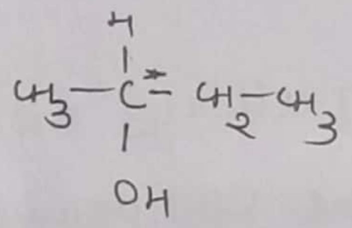


Total = 6

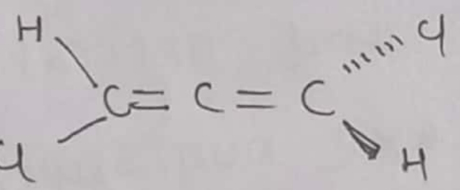
So Answer 4, 6

Q.5 $\boxed{A, C, D}$

(A)



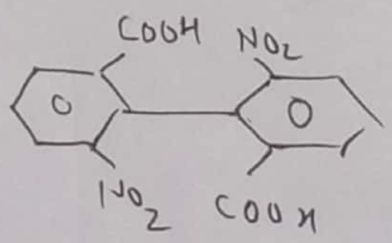
(C)



no COS,

no POS

(D)



no POS

no COS

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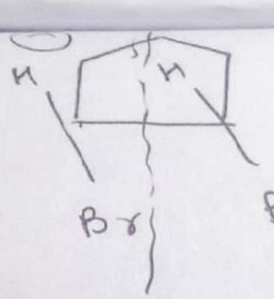
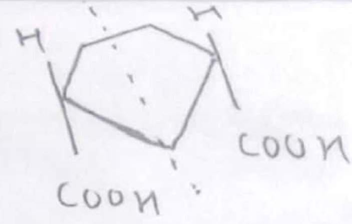
(6) all optical Inactive compounds are ~~NON~~ Non

(A, C) Resolvable, it means, Having POS, COS

Explain optical Inactivity



POS

(C) 

POS

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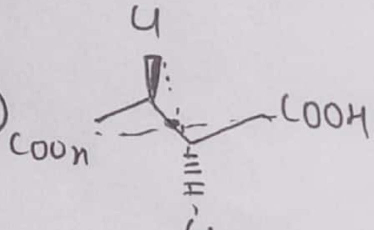
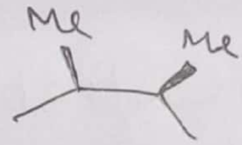
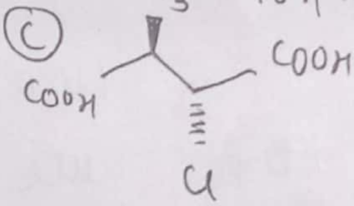
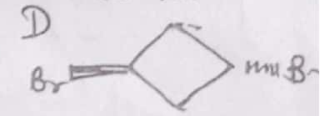
(7) B, C, D

Meso compound - Optical Inactive compounds Having ~~..~~ POS, or COS and atleast minimum two chiral centre must be present. these are achiral ~~mole~~ compound in which internal compensation is present

(A) 

(B) 

(C) 

D 

(A)
1. COS
2. 2 chiral centre

(B)
1. no chiral centre
2. no meso

(C)
1. no COS/POS
2. no meso

(D)
1. no chiral centre
2. no meso

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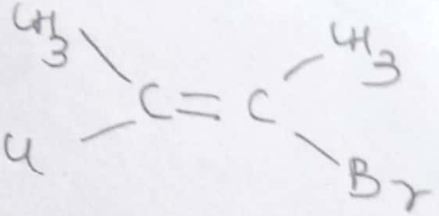
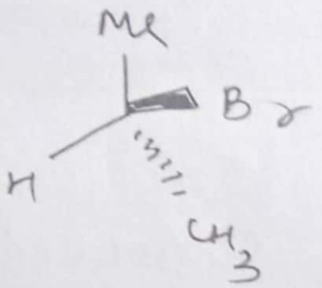
(8) A, B, ~~D~~ C, ~~ac to Soln 7~~

- according to solution 7

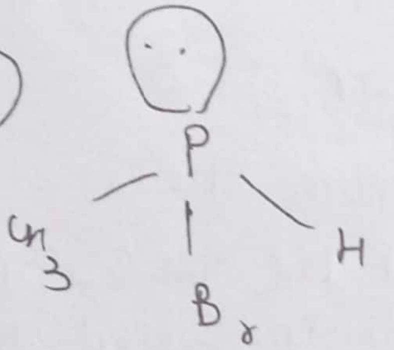
(9) A, B, D

(A) 

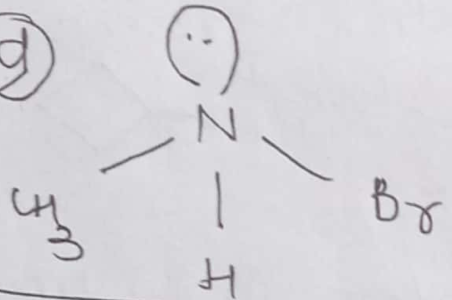
non resolvable
POS is present

(B) 

non resolvable
POS is present

(C) 

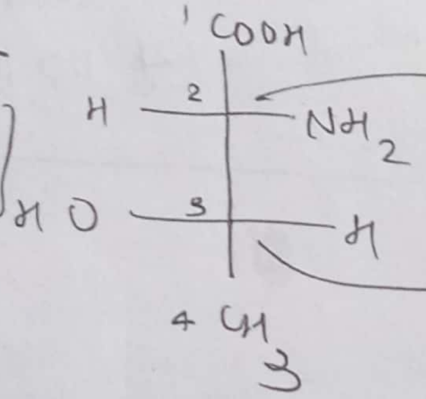
resolvable
Having no POS, COS

(d) 

Non resolvable
due to on amine Inversion

Q. 10

C, D



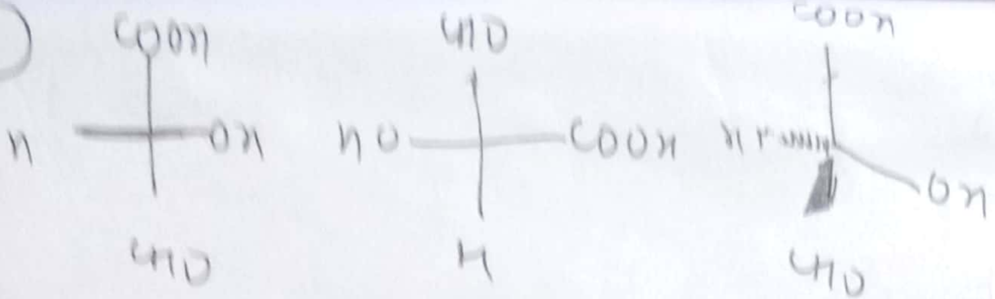
2 $\boxed{R}$

3 $\boxed{S}$

(D) "Threo"

Scanned with CamScanner

(11)



R S S

I II III

(A) I & II = Enantiomers [True]

(B) II & III Enantiomers [False]

(C) I & II Identical [False]

D II & III Identical [True]

(A, D)

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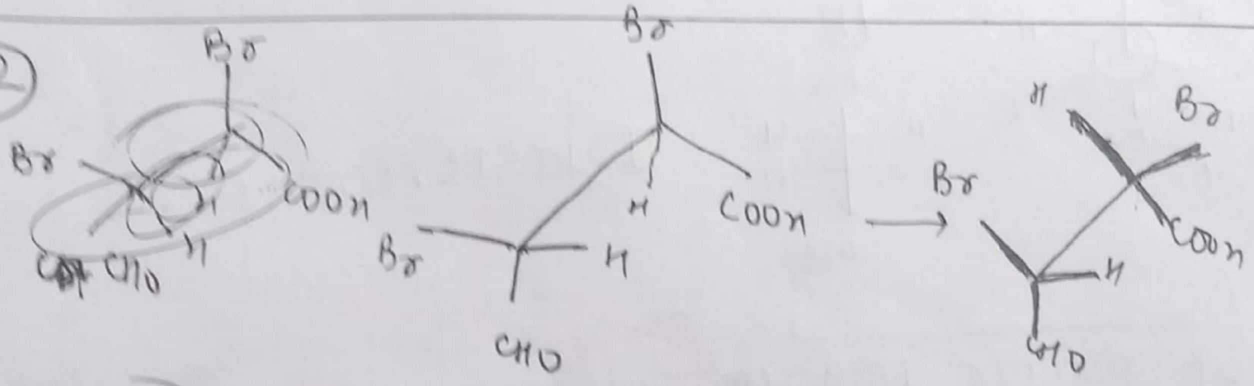
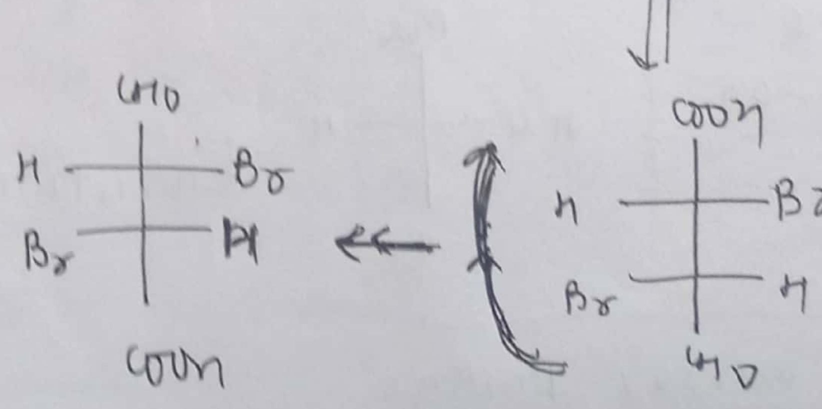
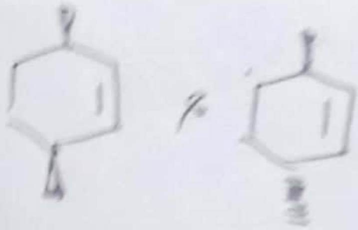
(12)

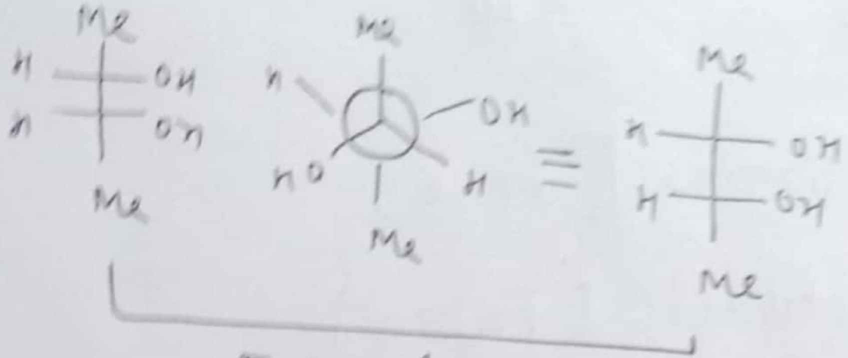


$\boxed{A, C}$

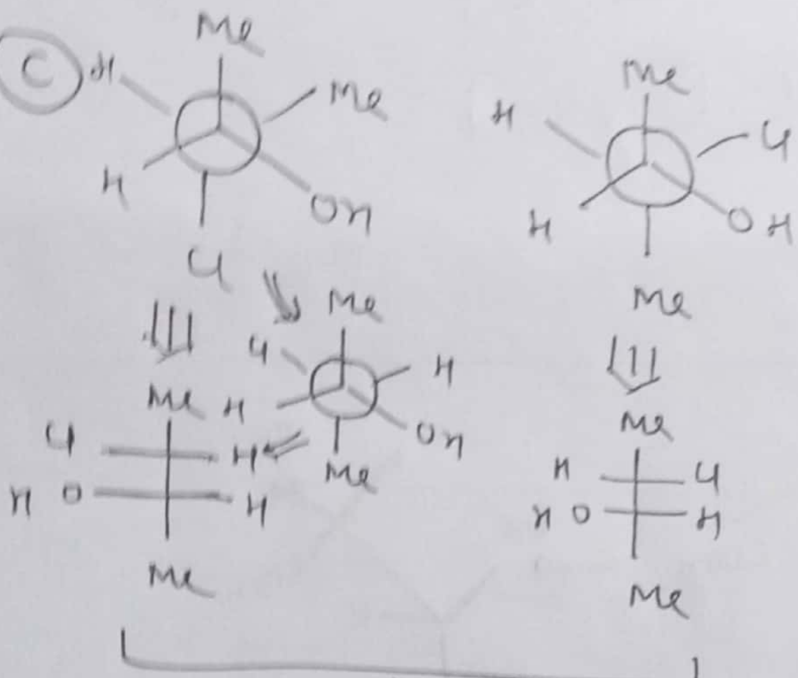


(13) A, B, C, D

(A)  Diastereomers [not mirror image]

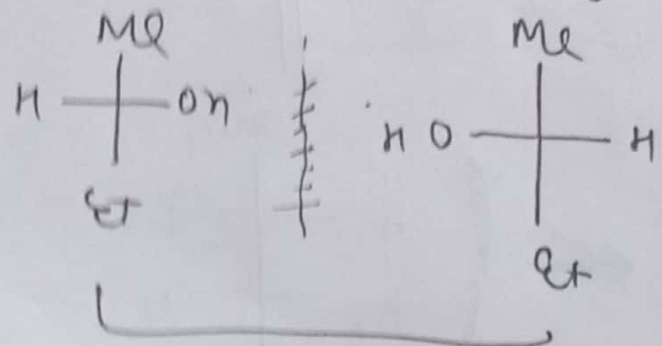
(B) 

Identical

(C) 

Diastereomers

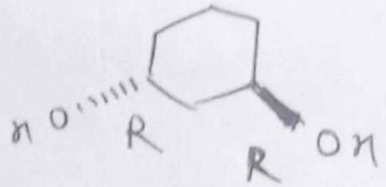
not mirror image

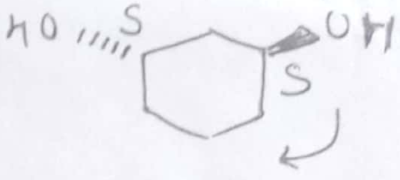
D 

Enantiomers

mirror Image

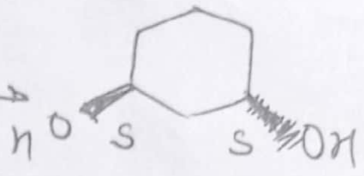
(14) (C)



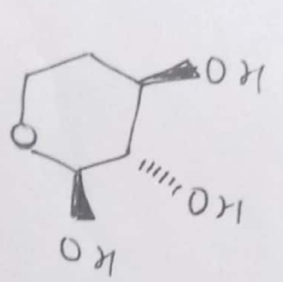


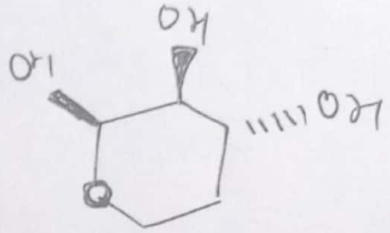
⇓ rotation clockwise

mirro image



(15) (D)

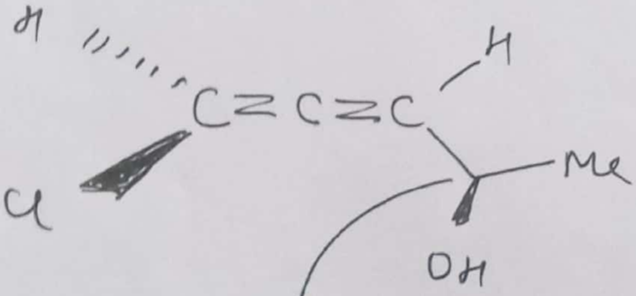
I 

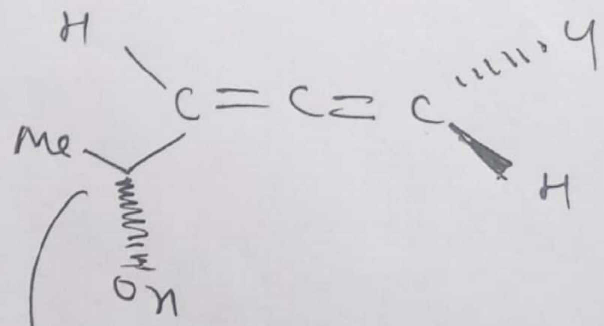


not mirror Image

Diastereomers

(16) (C)





$\boxed{R}$ $\boxed{R}$

Identical

Class - 12th

Stereo - Isomerism

$\boxed{\text{Ex - 3}}$

Sol - 1 In Resonance only delocalisation of πe^- take place ; while along with movement of πe^- migration of H , forms tautomer.

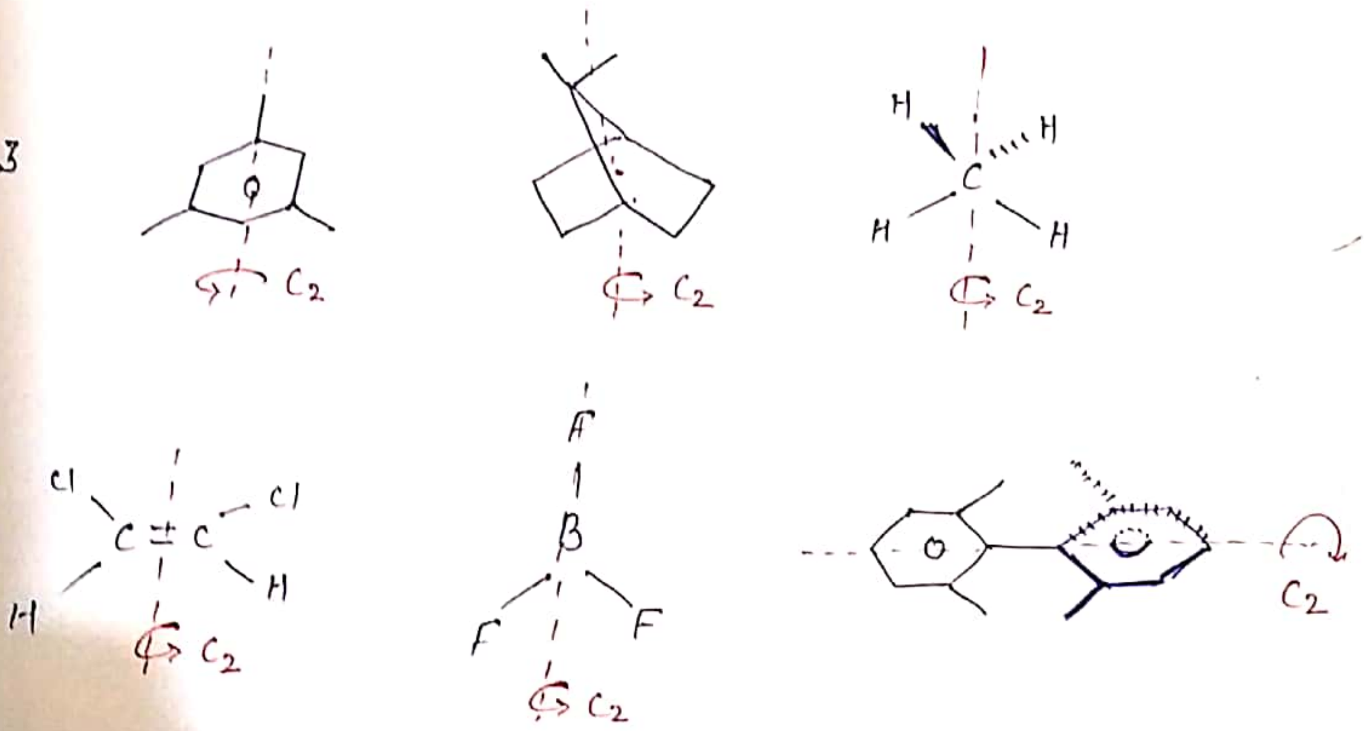
So X , Y : Resonating str.

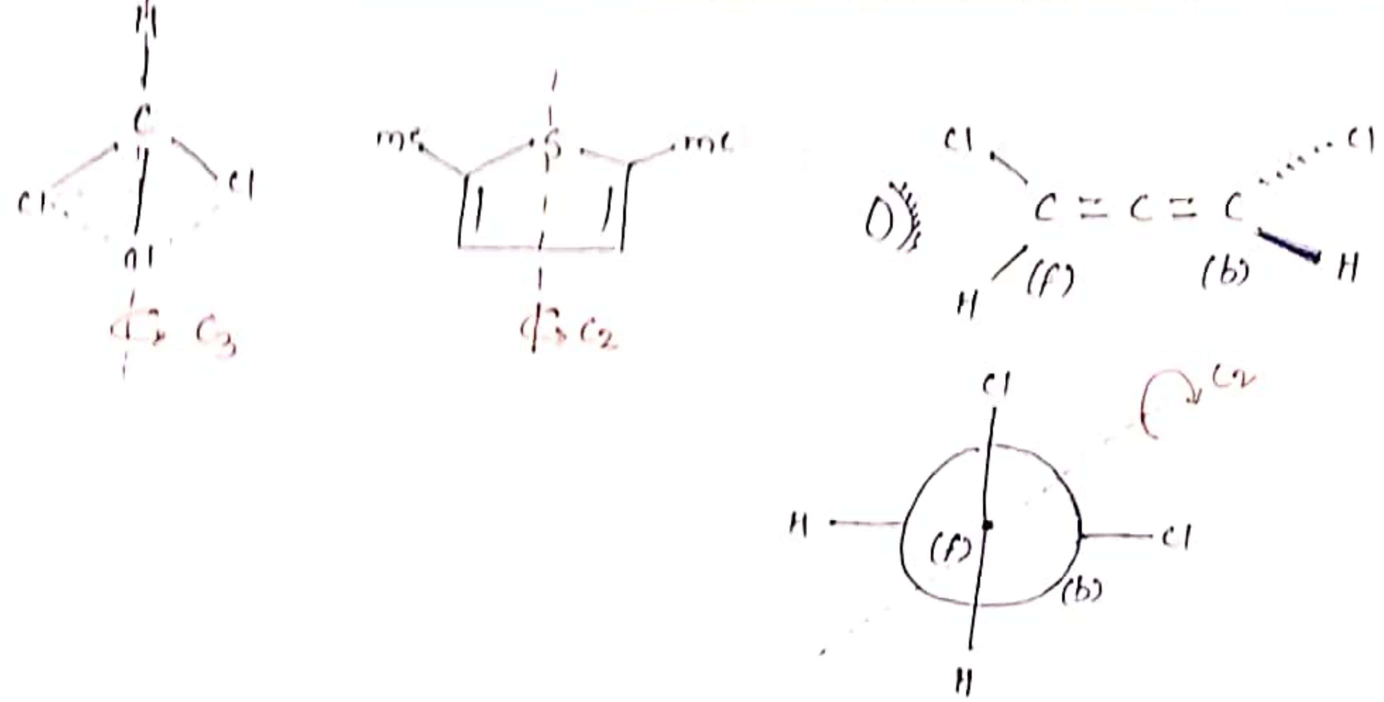
While Z is tautomer

Sol - 2 In (X) both $-CH_3$ are in anti - orientation while in (Y) both $-CH_3$ are in Gauche orientation.

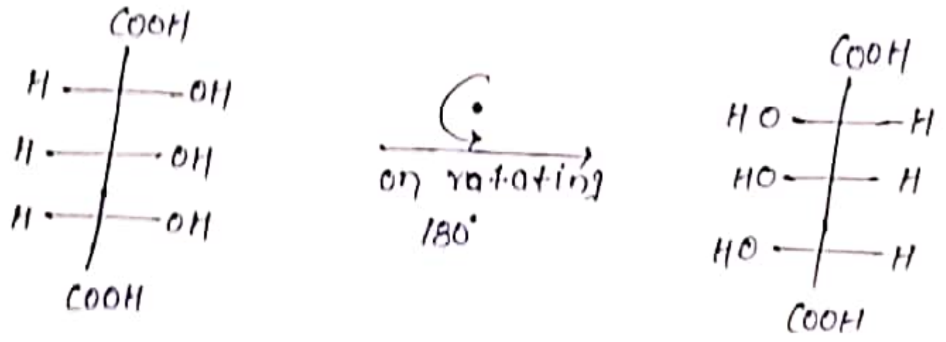
So Stable : X > Y [Repulsion Factor]

Sol - 3





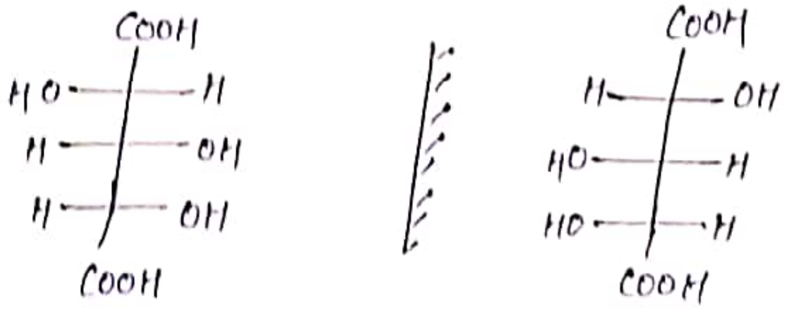
Sol-4 (i)



(I) (IV)

By just rotation of (I), (IV) compound observed; that's both are identical.

(ii)

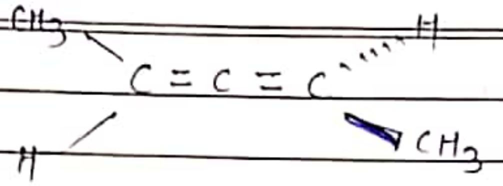


(III) (V)

O. Active O. Active

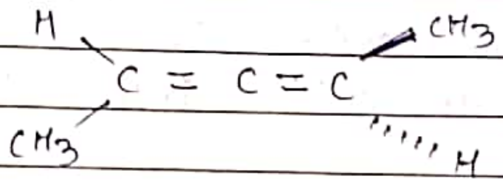
So (III) & (V) are Enantiomer.

Sol-5 :-



1^{st} Compound

O·Active

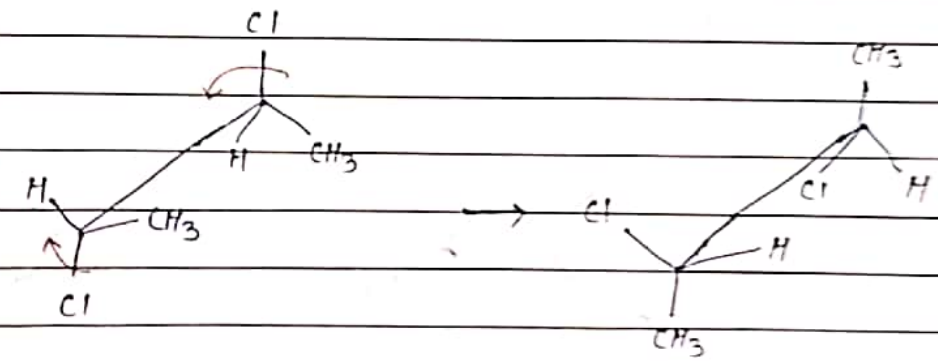


II^{nd} Compound

O·Active

1^{st} & II^{nd} are mirror Image of O·Active Comp. So they are enantiomers.

Sol-6 In (C)



1^{st} Comp. II^{nd} Comp.

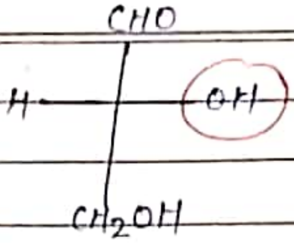
That's after rotation In 1^{st} Comp., II^{nd} Comp. received. So both are Identical.

(A) : Diastereomers

(B) : Diastereomers

(D) : Enantiomers

Sol-7 :-



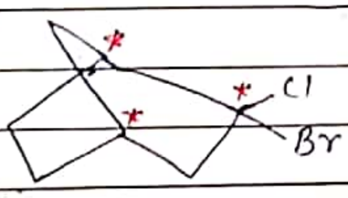
D (+) : Glyceraldehyde

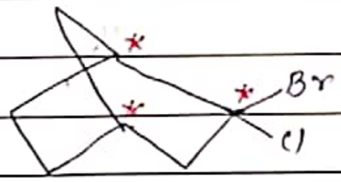
D : Indicate −OH at chiral Centre lies In right Side or −H at chiral Centre lies to left Side

+ : Indicate its dextrorotatory.

Sol-8 :- In Correct fischer diagram if $-NH_2$ at chiral Centre lies In left Side then "L" Configuration.

Sol-9





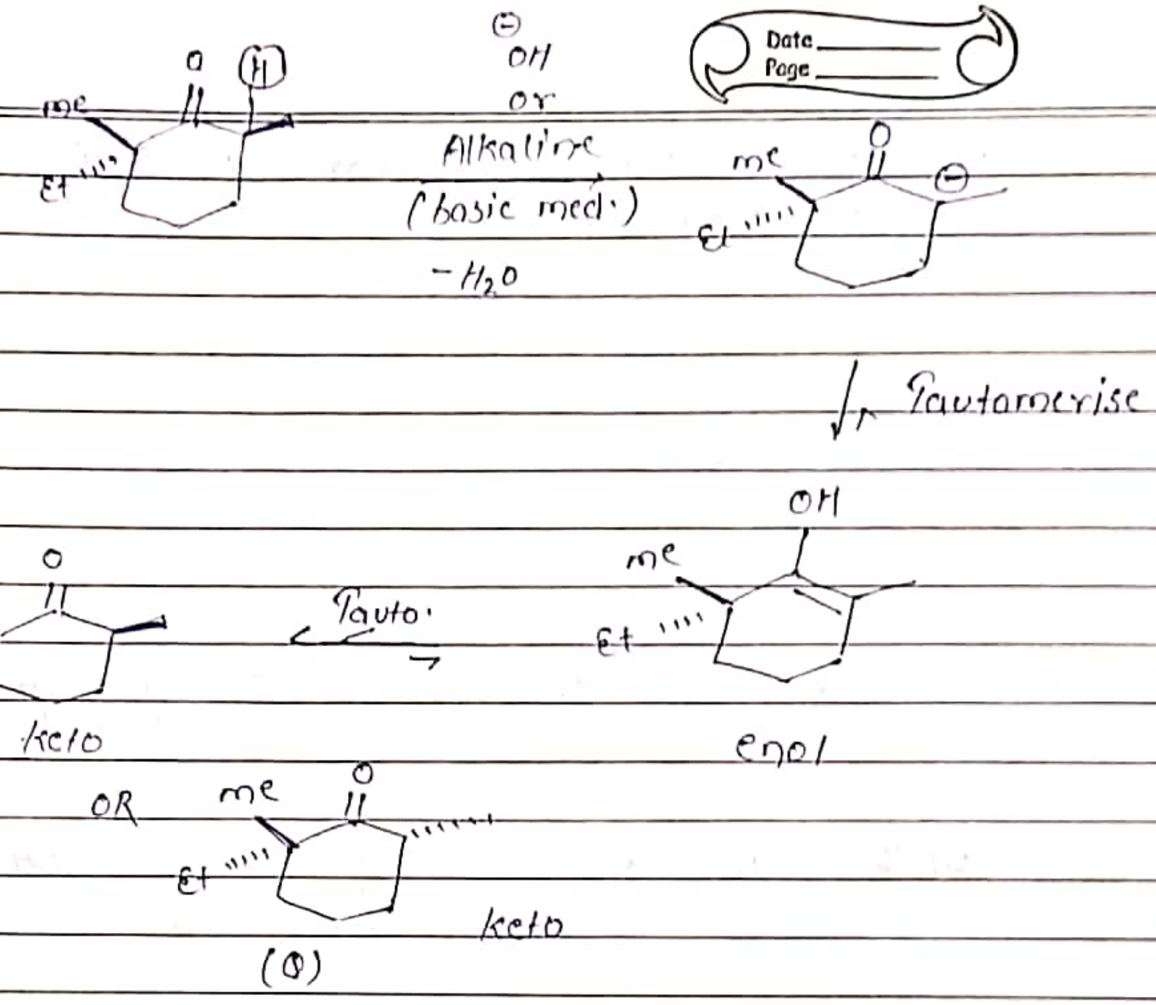
WAY-1 Stereo-Isomers which aren't mirror Image of each other, are diastereomers.

WAY-2 Out of 3 chiral Centre, there is change In Configuration only at 1 chiral Centre. Rest two are rigid. So both Compound are diastereomers.

Scanned with CamScanner

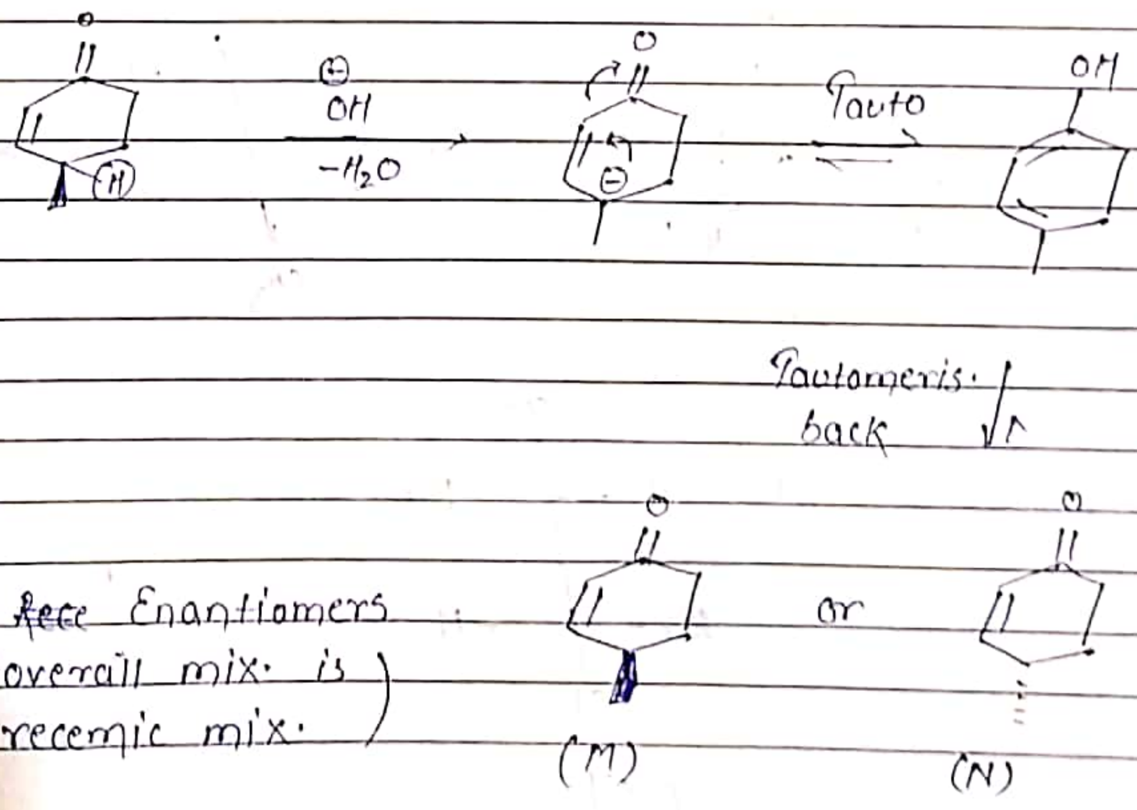
Sol-10

[A]



P, Q : Diastereomers

[C]



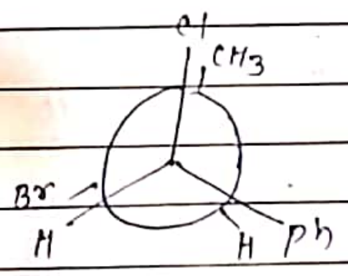
M, N : ~~Rece~~ Enantiomers
(overall mix. is
recemic mix.)

Sol-11 Comp A, C, D are : $CH_3-CH(OH)-CH(OH)-CH_2OH$

While B is : $CH_2(OH)-C(CH_3)(OH)-CH_2OH$

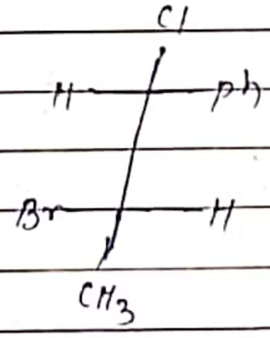
(B) is Structural Isomer (Position Isomer) of others.

Sol-12

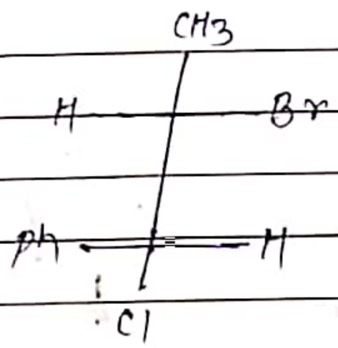


[X]

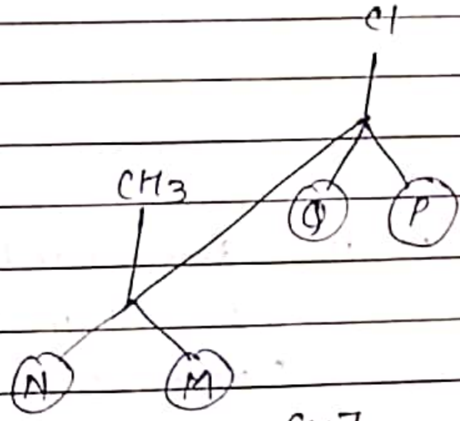
or



or



[X]



[Y]

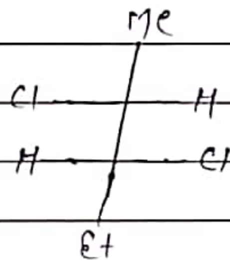
Now by Putting $M = -H$ & $Q = -Ph$
$N = -Br$ $P = -H$

or

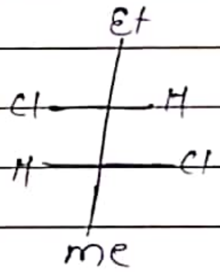
$M = -Br$ & $Q = -H$
$N = -H$ $P = -Ph$

We get diastereomeric relationship.

Sol-13 (P) :



or



Now (P) & (Q) are mirror Image of O. Active Compound. So Enantiomers.

Sol-14 (R) is Sawhorse projection.
(P), (S) : Newmann's projection
(Q) : Fischar projection.

Stereoisomerism Sheet
Solution for Ex-III Q.15 to Q.28.

For Q15 to Q.17

According to Paragraph :-

Molar Mass of MSG is 169 gm

Now, Concentration is 169/845 gm/ml
length is 200 mm = 2 dm
observed angle = $+9.6^\circ$

Specific rotation of (+)MSG = $\dfrac{\text{observed rotation}}{C \times l}$

$$= \frac{9.6}{\frac{169}{845} \times 2}$$

$$= \frac{9.6}{0.2 \times 2} = \frac{9.6}{0.4} = 24$$

It is $+24^\circ$ for (+) MSG and
-24° for (−) MSG.

Q.15 Ans = D None of these
as correct answer is -24°.

Q.16. Percentage Composition of Mixture of (+) MSG and (−) MSG.

Optical purity = $\dfrac{\text{observed rotation}}{\text{Specific rotation}}$

For Q.16 $Sp.\theta = -24^\circ$
$obs.\theta = -20^\circ$
Optical purity $= \frac{20}{24} = 83.33\%$ of (−) MSG

Now. 100 − Optical purity = Racemic Mixture

$100 - 83.33 = 16.66\%$ R.M.

Racemic mixture contains 50% (+) and 50% (−) form

Thus, 8.33% (+) MSG and 8.33% (−) MSG

Then total % of (−) MSG will be

$\underset{O.P.}{83.33\%} + \underset{\text{from RM}}{8.33\%} = 91.6\%$

Ans = C

Q.17 When the two solutions are mixed then their volumes are added thus total volume is 338 ml + 169 ml = 507 ml

Now, 16.9 gm of (−) MSG will cancel the rotation of 16.9 gm of (+) MSG from 33.8 gm of (+) MSG.

So, net amount of (+) MSG causing rotation will be 16.9 gm in 507 ml.

Thus Concn. 16.9/507 gm/ml
length 400 mm = 4 dm

and Sp. rotation we already have 24°.

hence in Q.17 $24 = \frac{\theta}{16.9/507 \times 4} = 3.2°$

and as it is of (+) MSG

Ans = C +3.2°

Q.18. (A) III Compound is chiral which has No POS, No COS it is Optically active

(B) IV Compound is having POS as well as COS

(C) V Compound is having POS as well as COS

(D) VII Compound is having POS.

Ans - (A) Compound III.

Q.19. (A) I Molecule is chiral, optically active

(B) II Molecule is chiral, optically active

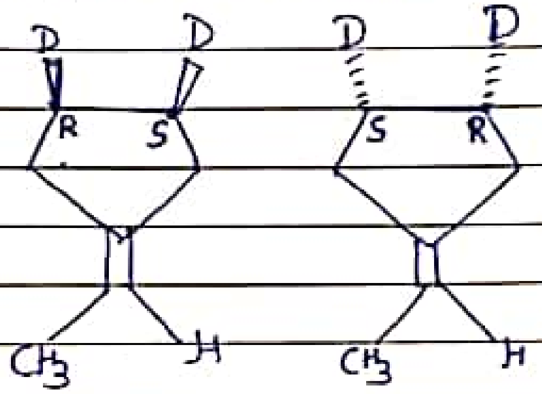
(C) V Molecule is achiral, it is optically inactive and not having any other active stereoisomer.
It can show G.I but not O.I.

Ans = C

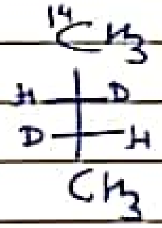
(D) VIII Molecule is achiral, it is optically inactive but it has another stereoisomer optically active thus it will show optical isomerism

Q.20 (A) structure differ around oxygen (ether) So they are Metamer.

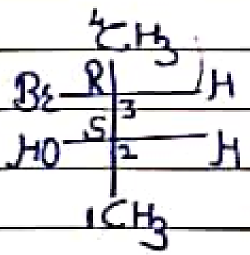
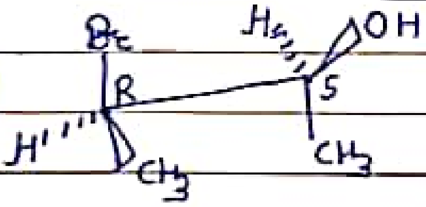
(B) I Compound is ether while II Compound is alcohol, different Functional grp so they are Functional isomers.

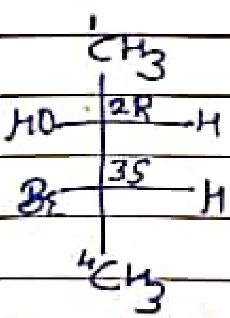
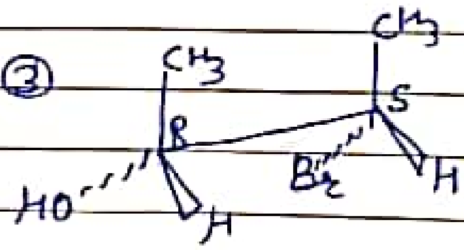
(C) 

Geometrical isomers but Mirror images. Thus enantiomers also

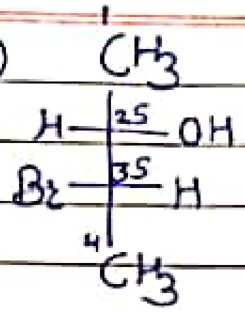
(D) when I Compound is rotated 180° in the plane of the paper, we get  which is Mirror image of II hence enantiomers.

Q. 21

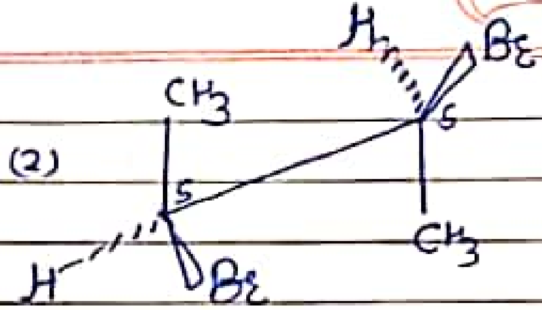
(A)  (4)  (iii) 2S, 3R

(B)  (3)  (iv) 2R, 3S

Q.21 (C)

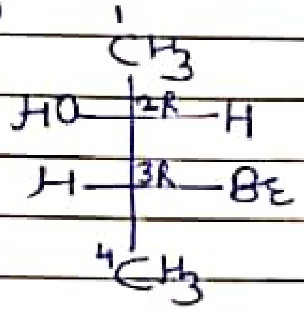


(2)

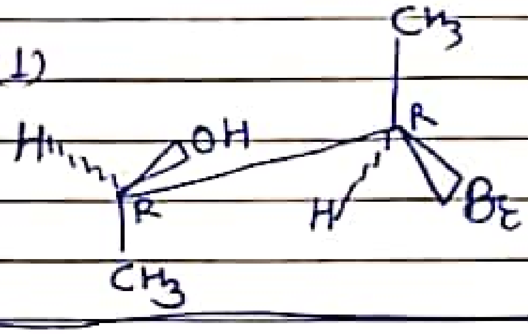


(ii) 2S, 3S

(D)



(1)



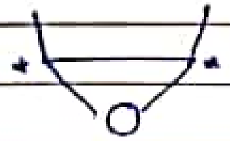
(ii) 2R, 3R

Q22 a) $Et - \overset{*}{C}H - Me$ with $COOH$ on the starred C — Chiral Molecule with one chiral Carbon

It will show optical isomerism

b) $Me - \underset{*}{C}H - COOH$ with $COOEt$ on the starred C — same as (a)

c)

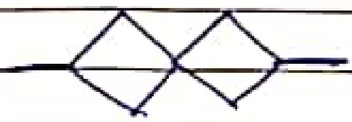


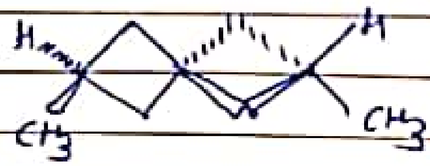
Two chiral carbon in the ring.

It will show Geometrical isomerism as well as optical isomerism.

Total 3 stereoisomers. Two active; one inactive

(d)



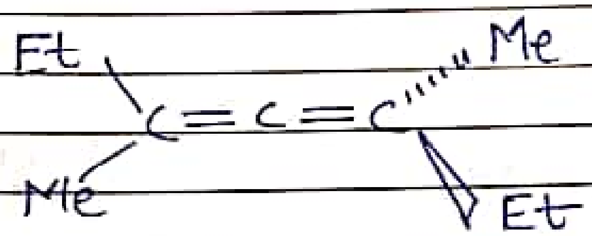


Chiral Molecule
No POS
No COS
Optically active

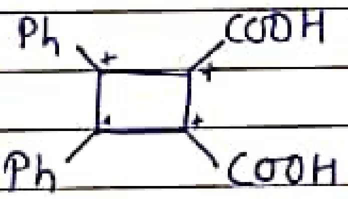
It will show optical isomerism.
Two optical isomers. Enantiomers.

Q.22. (e) achiral molecule with POS and COS
So No optical isomerism and Similar
grps on the ends so No Geometrical Isomerism

No Stereoisomerism.

(f) 

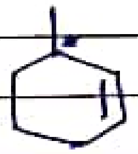
Same as (d)

(g) 

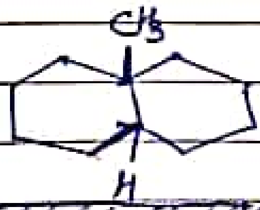
Four chiral Centres in the ring.

G.I as well as O.I.

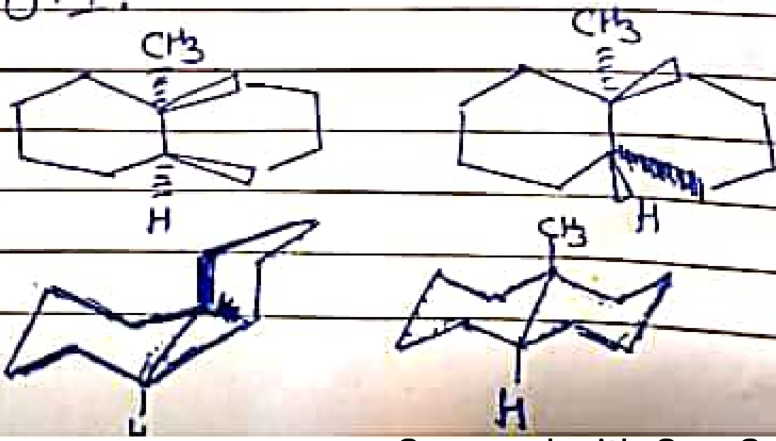
(h) achiral molecule with POS and COS and No geometrical isomerism generating System so No Stereoisomerism

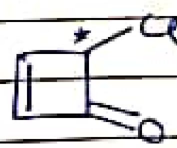
(i) 

chiral molecule with one chiral Centre
It will show optical isomerism.

(j) 

It will show both G.I as well as O.I.



(k) 

Same as (i)

Q.23 10 Benzenoid isomers are mentioned in the sheet solution.

Q.24. (a) Two chiral centres and odd switches on both, Thus Enantiomers.

(b) II is rotated in the plane by 180° will result in mirror image appearance Thus Enantiomers.

(c) Two chiral centers; odd switch on one, Producing non mirror image Stereoisomers Thus, Diastereoisomers, They are OI and GI also

(d) I is 1,2-Dibromo Cyclopentane and II is 1,3-Dibromo Cyclopentane. Thus Position isomers.

(e) Three chiral Centres; odd switches on 1st and 3rd chiral centre and 2nd chiral centre remains unchanged, resulting in non mirror image stereoisomers. Thus Diastereoisomers, They are O.I also

(f) II is rotated 180° in the plane of the paper resulting in non mirror image stereoisomers. Thus Diastereoisomers, They are O.I. also.

(g) One chiral Centre with odd switch. Chiral molecule Thus Enantiomers.

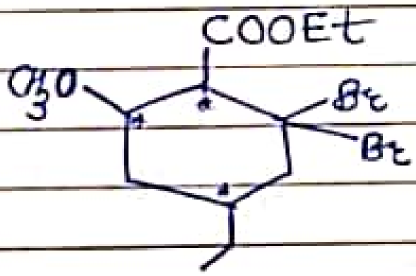
Q24. (h) Two chiral Centre; odd switches on both producing Mirror Image, but as achiral molecule, They are identical.

Mirror images with symmetry are identical.

(i) I is cis and II is Trans.
Geometrical isomers / Diastereomers. But not O.I

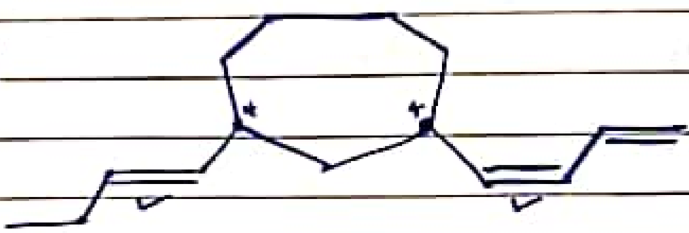
Q.25. 2 Moles of H_2 will remove 2 π bonds
So, different cases of 2 π bonds are given in sheet solution.
Triple bond is not possible in 6 membered ring

Q.26



3 chiral Centres.

Q.27
(i)

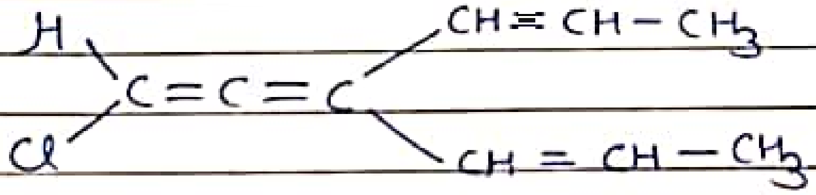


Two π bonds and Two chiral centres.
Total 4 Stereoisomerism generating units.

No. of Stereoisomers = 2^4

(ii) 8 dist arrangements with one Chiral form
Thus Total 9 (given in sheet Solution)

Q.27 (iii)



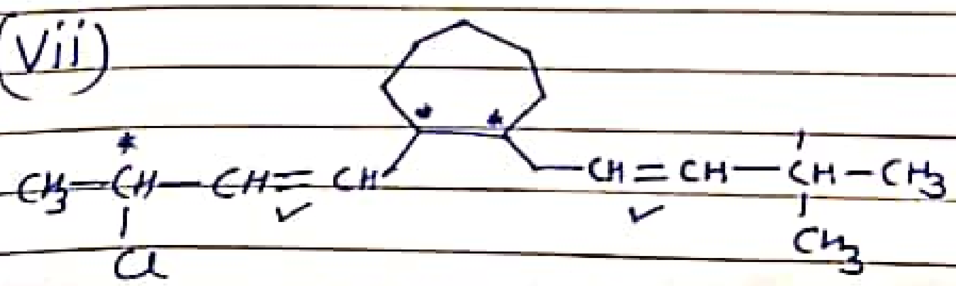
There are 4 Stereoisomers
In one Stereoisomer both the $>C=C<$ are cis.
In one Stereoisomer both the $>C=C<$ are trans
These two are optically inactive
and when one $>C=C<$ is cis and one $>C=C<$ is trans then there will be two Stereoisomers which will not have POS or COS about allene system which will be optically active.

(iv) Two Chiral Centre unsymmetrical Structure
Total 4 Stereoisomers.
All are optically active.

(V) Two Chiral Centre Symmetrical Structure
Total 3 Stereoisomers
Two are optically active and one is optically inactive.

(Vi) Three Chiral Centre Symmetrical Structure
Total 4 Stereoisomers.
Two active; Two inactive.

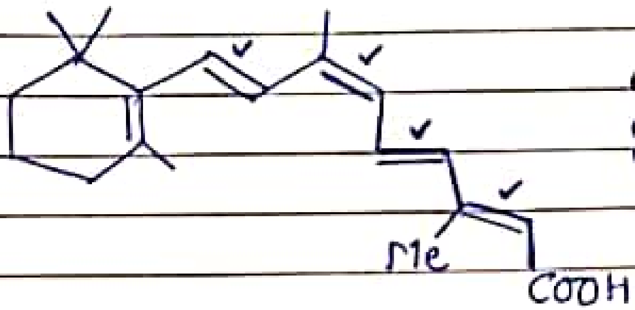
(Vii)



Total 5 Stereoisomerism generating units
Thus 2^5

Three Chiral Centres and two double bonds

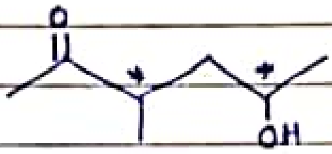
Q27
(viii)



Four double bonds as Stereoisomerism generating units
Thus 2^4

(ix) only one double bond will show Stereoisomerism.
Thus total 2 stereoisomers.

(X)



Two chiral Centres

Thus 4 Stereoisomers.

(Xi) same as (V)

Q.28. when $n=1$ C_2H_5Cl CH_3CH_2-Cl

$n=2$ $C_2H_4Cl_2$ CH_3-CHCl_2 $CH_2(Cl)-CH_2(Cl)$

$n=3$ $C_2H_3Cl_3$ $CH_2(Cl)-CHCl_2$ CH_3-CCl_3

$n=4$ $C_2H_2Cl_4$ $CH_2(Cl)-CCl_3$ $Cl-CH(Cl)-CH(Cl)-Cl$

$n=5$ C_2HCl_5 $Cl-CH(Cl)-CCl_3$

$n=6$ C_2Cl_6 CCl_3-CCl_3

Topic :- Stereo Isomerism

Ex - IV (A) - J-Mains

Q. 1

Sol^n Racemic Mixture ⇒ Equimolar mixture of Enantiomer is called racemic mix.

Ans - [4] Enantiomer with Chiral Carbon

Q. 2

Sol^n [I] $CH_3-CH=CH-CH_3$ Show GI

(II) $CH_3-\overset{*}{C}H(CH_2-CH_3)-OH$ Shows OI

GI and OI are include in stereo isomerism hence both are studied under stereo Isomerism

Ans - 4 Stereo Isomerism

Q. 3

Sol^n [I] $CH_3-CH_2-\overset{*}{C}H(CH_3)-CH_2-CH_2-CH_3$ (Chiral)

[II] $CH_3-CH_2-\underset{O}{\underset{\|}{C}}-\overset{*}{C}H(CH_3)-CH_2-CH_3$ (Chiral)

[III] $\overset{\oplus}{C}H_3$ (planar) (Achiral)

[IV] $CH_3-CH_2-CH(CH_3)-CH_2-CH_3$ (Achiral)

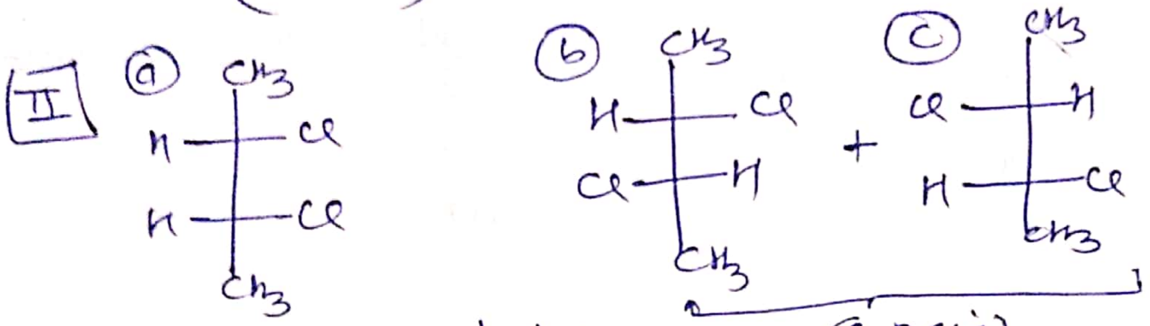
Ans - 2 only I & II are chiral compounds.

Q. 4

Solⁿ [I] $CH_3-CH_2-\overset{*}{C}H(Cl)-CH_3 \rightarrow$ (2) $\left.\begin{array}{l}\text{R-Form}\\ \text{S-Form}\end{array}\right\}$ E.pair

(Chiral)

[II]



Meso-2,3-dichlorobutane

(E.pair)

[III] $C-\overset{*}{C}(Cl)-\overset{*}{C}(Cl)-C-C \rightarrow$ (4) $\left.\begin{array}{l}\text{R,R}\\ \text{R,S}\\ \text{S,R}\\ \text{SS}\end{array}\right\}$ all are chiral & O.Active

2,3-dichloropentane

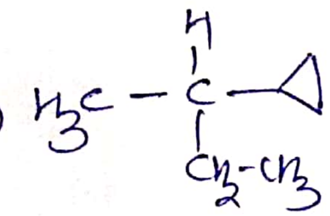
[IV] 2-Hydroxy Propanoic Acid

$CH_3-\overset{*}{C}H(OH)-\underset{\|}{C}(O)-OH$ (2) $\left.\begin{array}{l}\text{R}\\ \text{S}\end{array}\right\}$ E.pair ↓ chiral (O.Active)

Ans - (2) 2,3-dichloro butane

Q.5

Solⁿ (3)



is O. Active Alkane having lowest molecular mass in given examples

Ans - (3)

Q. (6)

Sol.ⁿ

(1) 1-chloropentane

$H_3C-CH_2-CH_2-CH_2-CH_2Cl$

(Achiral)

(2) 2-chloropentane

$CH_3-\overset{*}{C}H(Cl)-CH_2-CH_2-CH_3$

(chiral)

(3) $H_2C(Cl)-\overset{*}{C}H(CH_3)-CH_2-CH_2-CH_3$

(chiral)

(4) $H_3C-CH(CH_3)-\overset{*}{C}H(Cl)-CH_2-CH_3$

(chiral)

Ans - (1) is Achiral

Q. (7)

Sol.ⁿ $H_3C-CH(CH_3)-CH(CH_3)-CH_3 \xrightarrow{Cl_2/h\nu}$

(1) $H_3C-CH(CH_3)-CH(CH_3)-CH_2-Cl$

(2) $CH_3-CH(CH_3)-C(Cl)(CH_3)-CH_3$

2,3-dimethyl butane

↓

Gives only (2) mcp only

Ans - (3)

Q- (8)

Sol.ⁿ $H_3C-\overset{*}{C}H(Cl)-\overset{*}{C}H(Cl)-CH_3$ → It shows optical Iso. b/c It contains chiral centre.

(2,3-dichlorobutane)

Ans - (3)

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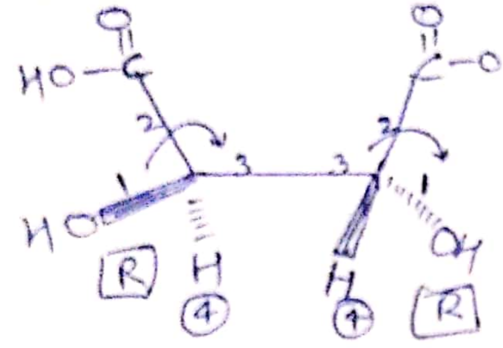
Q. (9)
Sol.ⁿ



⇒ Both chiral centre have R,R configuration.

Ans - (2) R,R

Q. (10)
Sol.ⁿ $CH_3-\underbrace{CH=CH}_{GI\checkmark}-\overset{*}{C}H(OH)-CH_3$

$n = 2$ (sym → Absent)

Total Stereo $= 2^n$

Total Stereo (S) $= 2^2$

$= (4)$

Ans - (1)

Q. (11)
Sol.ⁿ (1) $H_3C-C(CH_3)=CH-CH_2-CH_3$ ⇒ No optical

2-methyl-2-pentene

(2) $H_3C-CH=C(CH_3)-CH_2-CH_3$ GI✓ ⇒ No optical

3-methyl-2-pentene

(3) $CH_2=CH-CH_2-CH(CH_3)-CH_3$ No optical

4-methyl-1-pentene

(4) $CH_2=CH-\overset{*}{C}H(CH_3)-CH_2-CH_3$ → chiral and it shows optical iso.

Ans - (4)

Q (12)

Sol^n (1) $CH_3-\overset{*}{C}H(Cl)-\overset{O}{\overset{\|}{C}}-H$ → chiral & O. ~~in~~active

2-chloro propanal

~~(3) $H_3C-C(CH_3)(Cl)$~~

(2) $CH_3-CH(Cl)-CH_2-CH_3$

2-chloro butane
(chiral & O. Active)

(3) $H_3C-C(CH_3)(Cl)-CH_2-CH_3$

(Achiral
O. inactive)

(4) $CH_3-CH(Cl)-CH_2-CH_2-CH_3$

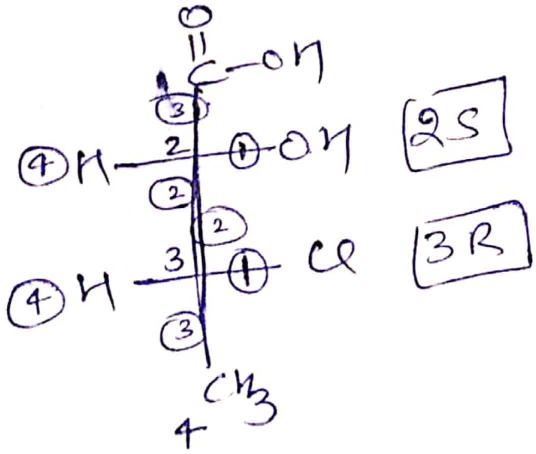
chiral & O. Active

2-chloro-2-methyl butane

Ans - (3)

Q. (13)

Sol^n



[2S, 3R]

Ans - $\boxed{3}$ 2,S, 3R

8 April

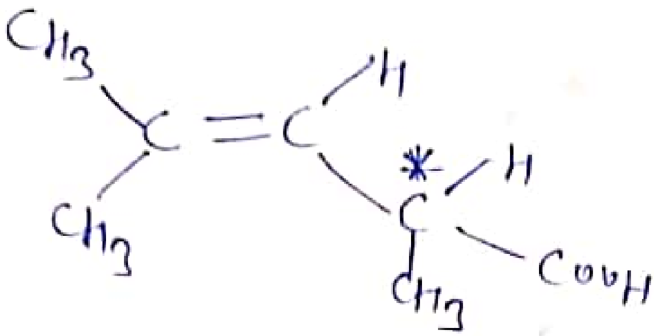
Stereoisomerism

Akash Gupta (OC)

Ques 1

Soln

(B) Ans

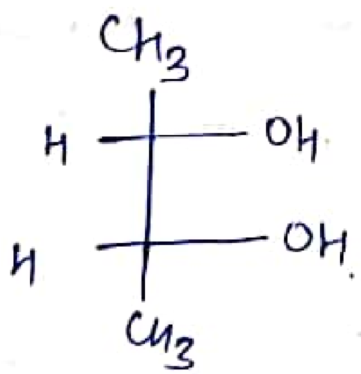


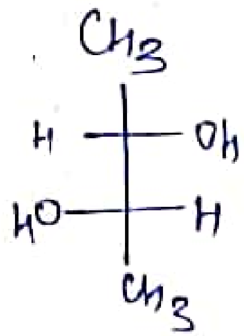
∴ Due to presence of chiral center (*) it is optically active, thus show optical Isomerism.

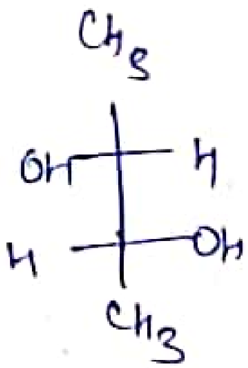
Ques 2

$CH_3-\overset{*}{C}H(OH)-\overset{*}{C}H(OH)-CH_3$

Soln



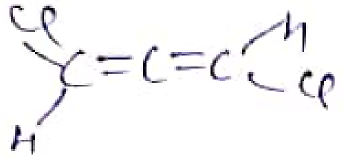




(7) ∴ Statement - I is true as per defination by NCERT

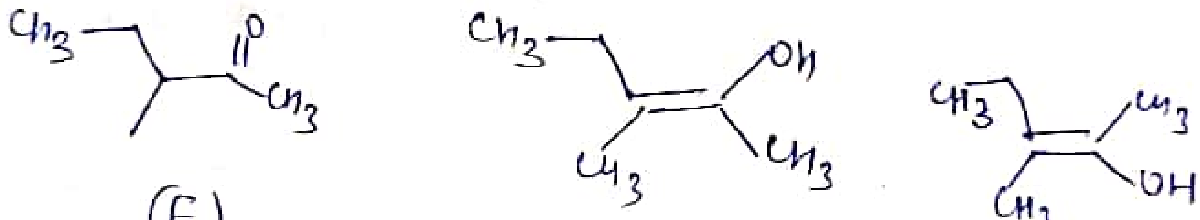
Ans (C)

Statement - II is false



It is optically active compound without chiral center.

(8)



(E) (F) (G)

Ans (B, C, D)

(A) This statement is false as "E" has no conjugation, so no resonance.

(B) Presence of α-H and are Keto-enol form.

(C) Cis / Trans form so G.I.

(D) G.I. are not mirror images of each other so diastereomers.

(5) ∴ Sol^n

Ans. (D)

(A) $CH_2=C(CH_3)-CH_2-CH_3$ G.I (✗) Optical (✗)

(B) $HC\equiv C-CH(CH_3)-CH_3$ G.I (✗) Optical (✗)

(C) $CH_3-CH(CH_3)-CH_2-C(=O)-OH$ G.I (✗) Optical (✗)

(D) $CH_3-CH_2-\overset{*}{C}H(CH_3)-C(=O)-OH$ optically active due to presence of chiral center, thus it exhibits stereoisomerism.

---

(6) Sol^n

$CH_3-CH(CH_3)-CH_2-CH_3 \xrightarrow{Cl_2/h\nu}$ monochlorination

Ans (B)

$CH_2(Cl)-\overset{*}{C}H(CH_3)-CH_2-CH_3$ (2) chiral compounds R and S possible

$CH_3-C(Cl)(CH_3)-CH_2-CH_3$ achiral

∴ Thus total 4 chiral compounds

$CH_3-CH(CH_3)-\overset{*}{C}H(Cl)-CH_3$ (2) chiral compounds R & S possible

$CH_3-CH(CH_3)-CH_2-CH_2-Cl$ achiral

(3) Ques

$CH_3-\underset{\large CH_3}{\underset{|}{CH}}-CH_2-CH_3 \xrightarrow{Cl_2/h\nu}$ Mono Chlorination

Sol^n

Ans (A)

(i) $\underset{\large Cl}{\underset{|}{CH_2}}-\overset{*}{\underset{\large CH_3}{\underset{|}{CH}}}-CH_2-CH_3$

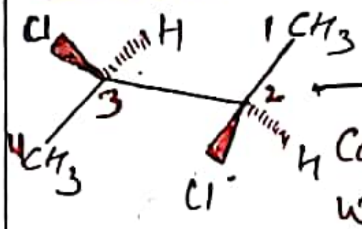
(ii) $CH_3-\overset{\large Cl}{\overset{|}{\underset{\large CH_3}{\underset{|}{C}}}}-CH_2-CH_3$ No Chiral Center

(iii) $CH_3-\underset{\large CH_3}{\underset{|}{CH}}-\overset{\large Cl}{\overset{|}{\underset{*}{CH}}}-CH_3$

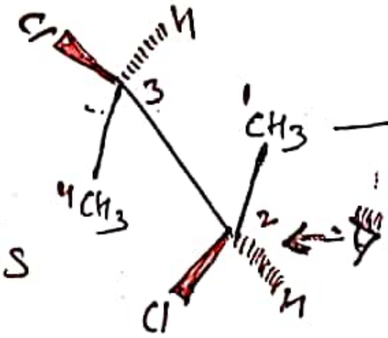
(iv) $CH_3-\underset{\large CH_3}{\underset{|}{CH}}-CH_2-CH_2-Cl$ No chiral Center

$\therefore$ (i), (iii) form two ~~and~~ enantiomeric pair due to presence of chiral center

Q9 solution:→

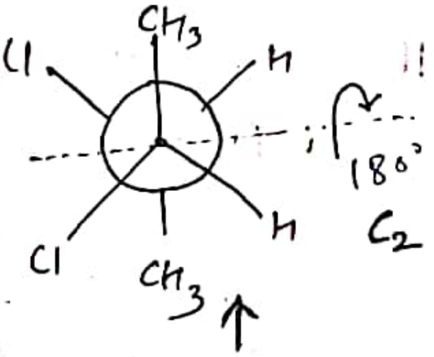


⟶ Can be write as



Draw newoman's Projection across C_2–C_3 carbon.

⟶



Now check
P.O.S = absent
C.O.S = absent
A.O.S = C_1 / C_2

Q10 solution:-

$$CH_3-\overset{*}{\underset{OH}{CH}}-\underbrace{CH=CH}_{G.I}-\overset{*}{\underset{OH}{CH}}-CH_3 = \boxed{n=3}$$

No of stereoisomer $= 2^{n-1} + 2^{\frac{n-1}{2}} = 6$

stereoisomer of are :

①	R	Cis	R	④	R	Trans	R
②	R	Cis	S	⑤	R	Trans	S
③	S	Cis	S	⑥	S	Trans	S

① and ③ are Enantiomer's = 2 cis enantiomer

④ and ⑥ are Enantiomer's = 2 trans enantiomer

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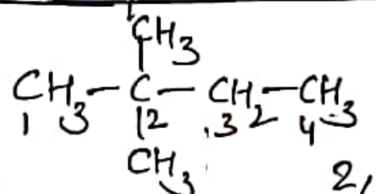
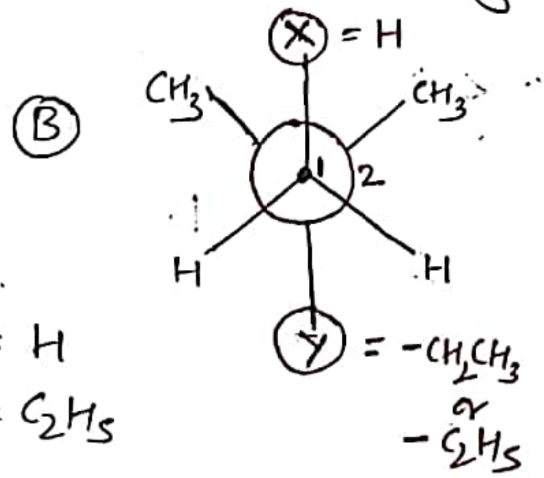
Q11 → solutions:-

Ans = B, D

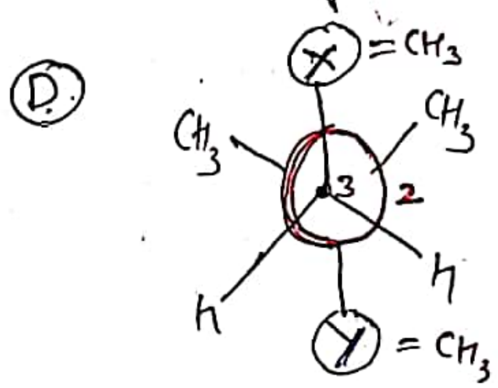


2, 2-dimethylbutane.



$X = H$
$Y = C_2H_5$

Newman's projection across $C_1 - C_2$ Carbon.



$X = CH_3$
$Y = CH_3$

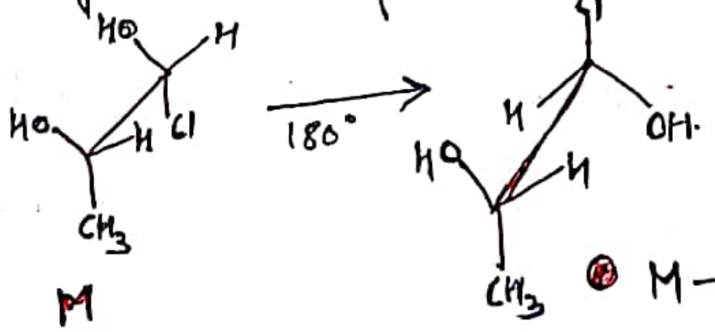
Newman's projection across $C_3 - C_2$ Carbon.

Q12 - solution: A/B/C

(Diastereomer's)

(A) M and N are non mirror images stereoisomer. because in structure M both Hydrogen is same side were as in struture N both hydrogen is opp-side

(B) M and O are Identical, because if we draw conformation of M at 180° we get structure O



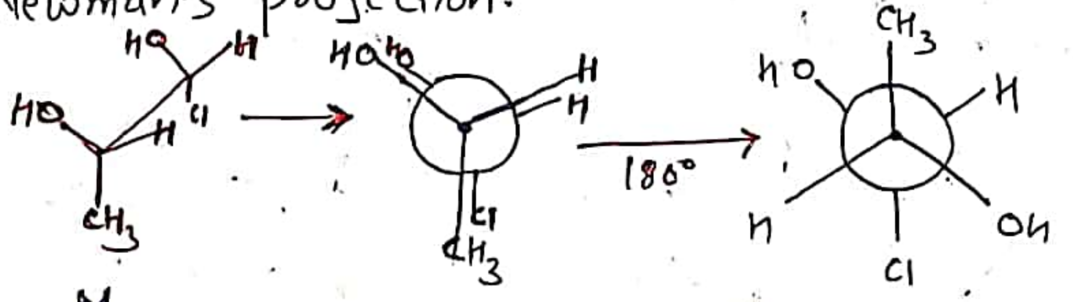
● M → Identical with O

P.T.O.

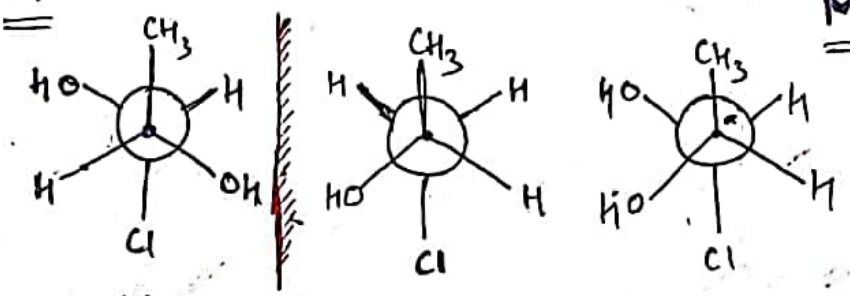
Q12 solution: remaining portion;

ⓒ M and P are enantiomer's ;

First convert sawhorse projection of M into Newman's projection.



M M

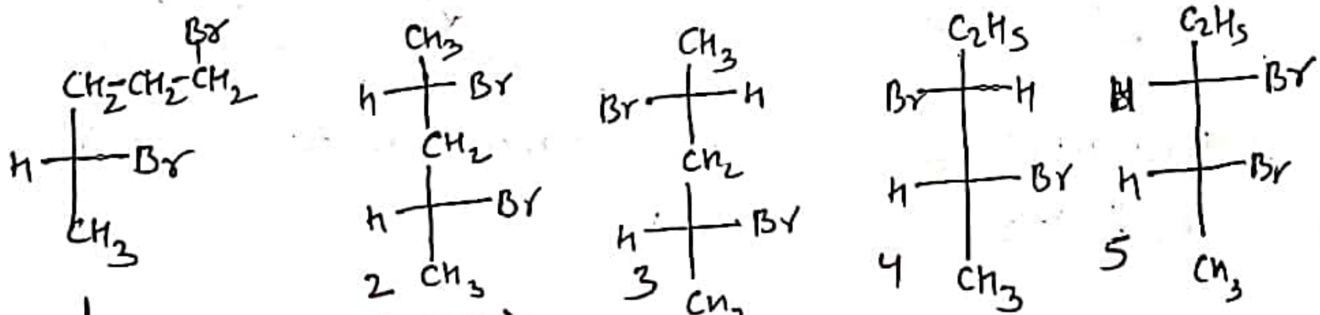


M P Q

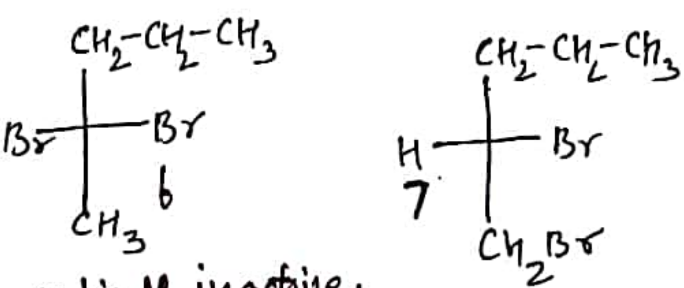
M and P → Enantiomer / M and Q → Diastereomer's.

Q13 and 14 solution available in sheet.

Q15 → Ans = 5 (solution)



(Meso)

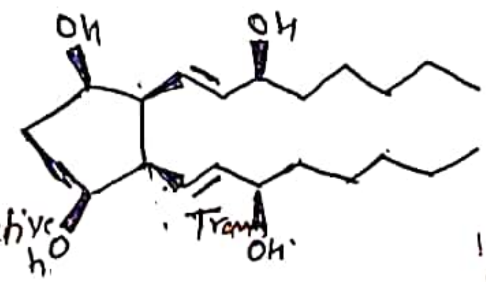


optically inactive.

optically active or chiral product is = 1, 3, 4, 5, 7

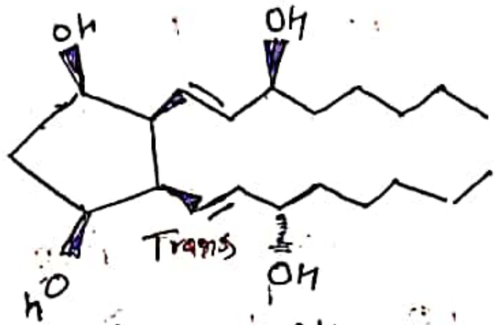
Q16- Solution Ans : 7

(1)

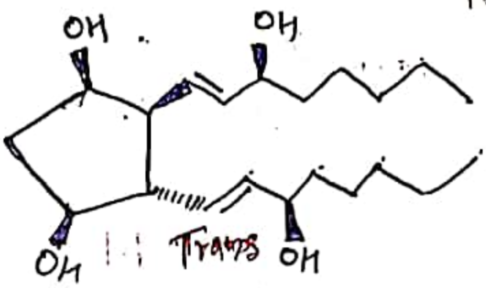


O.Inactive

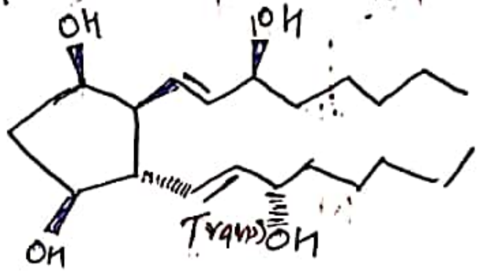
(2)



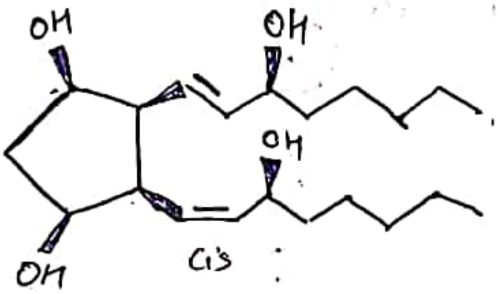
(3)



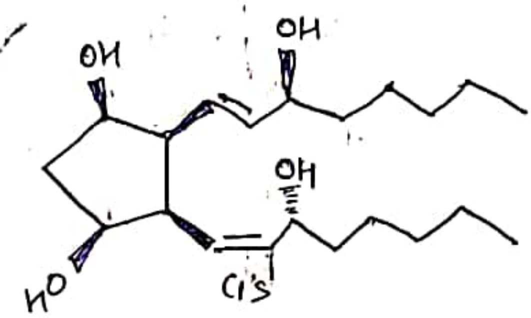
(4)



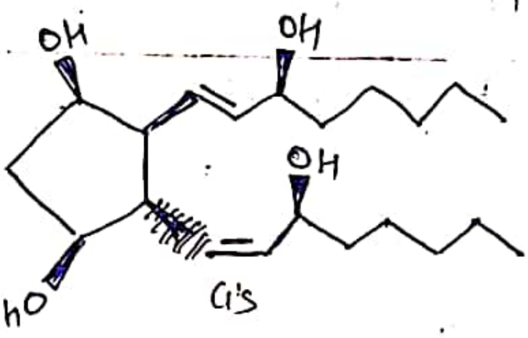
(5)



(6)



(7)



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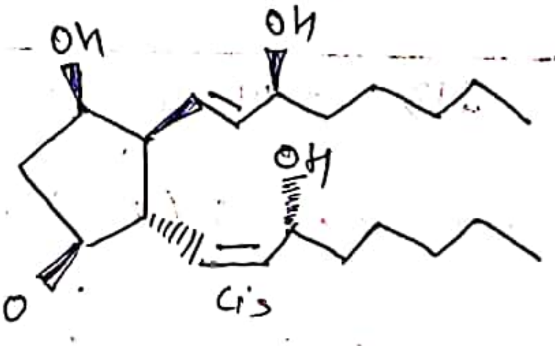

structure (1) is optically Inactive due to presence of P.O.S