Solution DPP-03

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1. Concentration of (−) Mandelic Acid = 25%

Concentration of (+) Mandelic Acid = 75%

Excess of (+) Mandelic Acid = 75 − 25

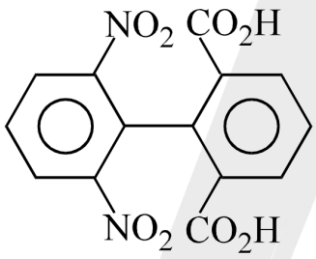
= 50%

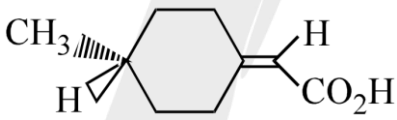
$$\text{Enantiomeric Excess} = \frac{\text{Obsened specific rotation} \times 100\%}{(\text{.sp. rotation of pure (+)Enantiomer})}$$

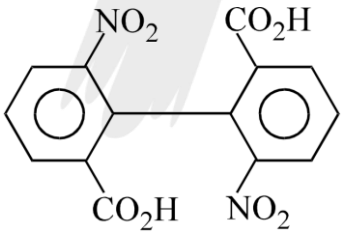
$$50 = \frac{x}{158} \times 100.$$

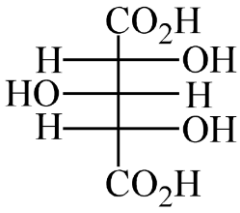
$$\left(\frac{x=+79}{\text{Obsened specific rotation}}\right)$$

2. Optically Active Compound - A chiral compound is considered as optically active (which can rotate Plane polarized light) and do not have plane of symmetry and centre of symmetry.

(A)  Optically Inactive

(B)  It is optically active

(C)  It is optically active as they will align in mutually perpendicular direction to reduce steric repulsion & it will be Non-planar

(D)  It is optically Inactive(meso)

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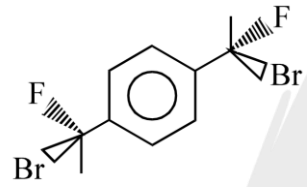
3. correct statement - (a), (b), (c)

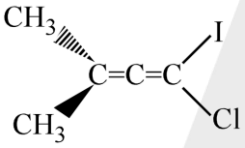
Enantiomer - are chiral molecule that are mirror images of one another & are non-superimposable.

Diastereomers - are stereoisomers that are not mirror Images of one another and are non-superimposable.

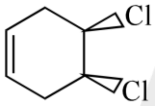
4. Chiral Compound – A Carbon having Four different valencies.

(a) 

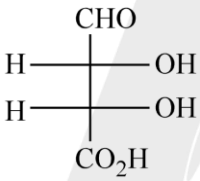
It is Chiral Compound

(b) 

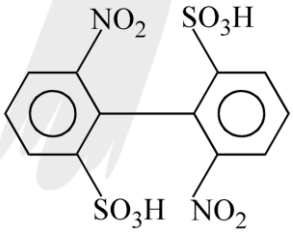
Not a Chiral Compound

(c) 

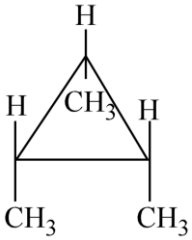
Not a Chiral Compound

(d) 

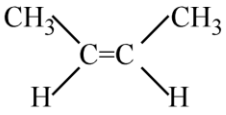
It is Chiral Compound

(e) 

It is Chiral Compound

(f) 

Not a Chiral Compound

(h) 

Not a Chiral Compound

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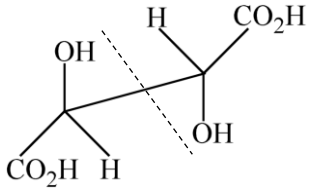
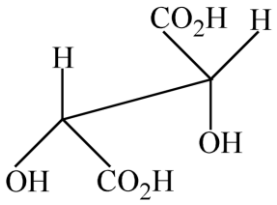
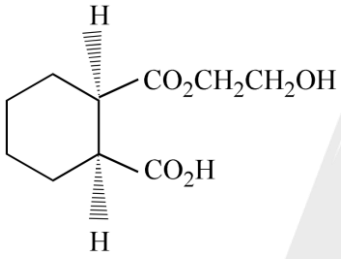
5. **(A)** 

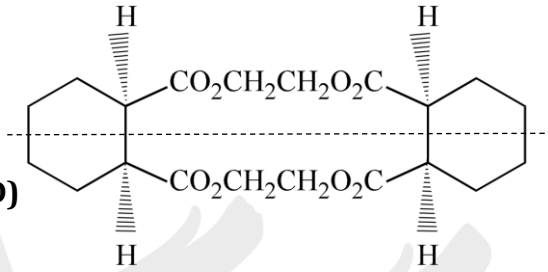
- even no. of chiral centre (=2)
- meso compound.
- Achiral.

(B) 

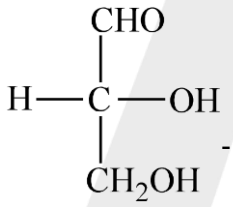
- No Plane of symmetry
- Achiral.
- even no. of chiral centre (=2)

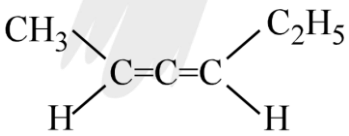
(C) 

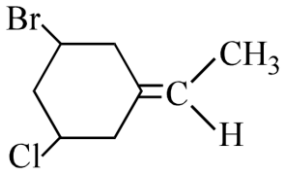
- chiral
- even no. of chiral centre (=2)
- No Plane of symmetry

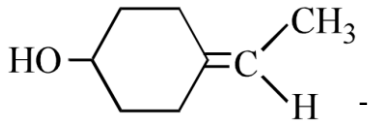
(D) 

- Achiral
- meso compound.
- even no. of chiral centre (=2)

6. (A)  - chiral (As carbon have 4 different Valencies)

(B)  - chiral Compound

(C)  - chiral Compound

(D)  - chiral Compound

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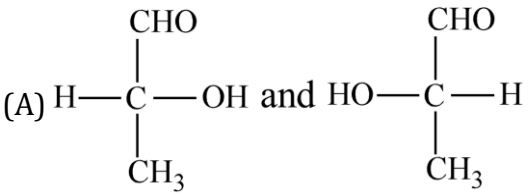
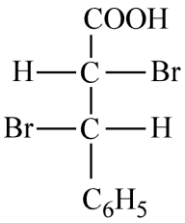
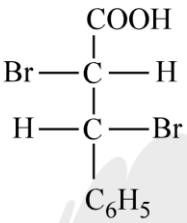
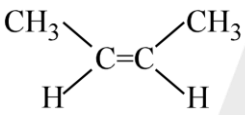
7. (A)  and

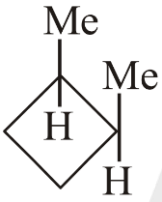
They are enantiomer

(B)  and 

They are Enantiomer

(C)  and 

They are diastereomers

8. 

→ It possess plane of symmetry

→ No centre of symmetry.

→ It will Show optical Isomerism

→ Show Geometrical Isomerism

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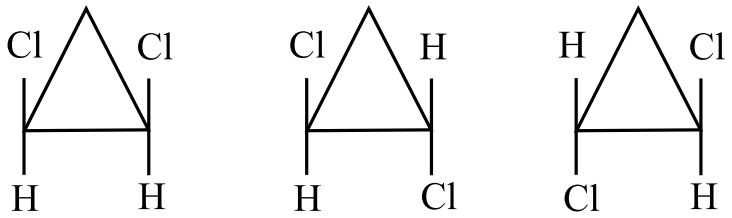
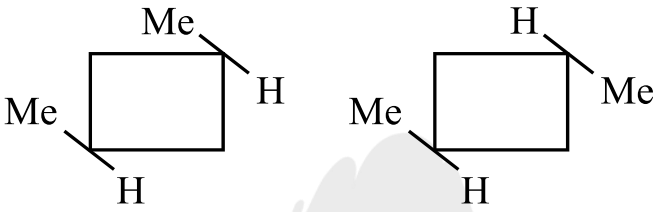
9. (i)



(w) Total= 3

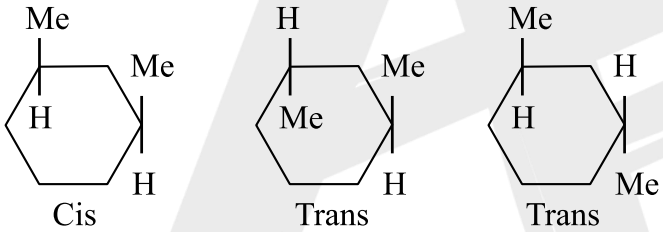
(ii)



(x) Total= 2 (No Chiral centre)

(iii) $-CH_3 - \overset{*}{C}H(Cl) - \overset{*}{C}H(Br) - CH_3$ (y) Total = $2^2 \Rightarrow 4$

(iv)

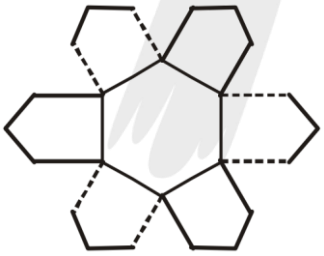


(z) Total = 3

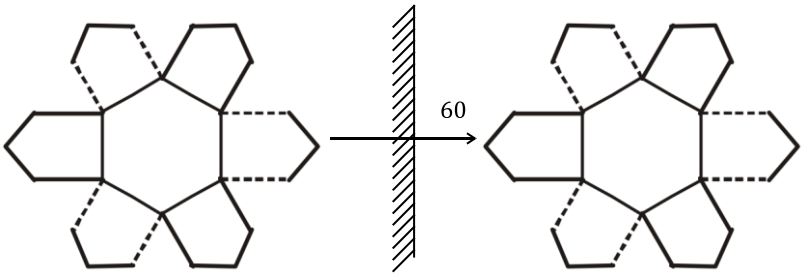
So, $w + x + y + z \Rightarrow 12$

$3 + 2 + 4 + 3 \Rightarrow 12$

10.



→ It has C_3 Axis symmetry



Rotate By 60^o & form a mirror image

So, S_6 Alternating Axis of Symmetry