

JEE Main Chemistry Previous Year Questions With Solutions on Isomerism

1. Monocarboxylic acids are functional isomers of :

- (1) Esters
- (2) Amines
- (3) Ethers
- (4) Alcohols

Solution:

Monocarboxylic acids are functional isomers of esters because esters and monocarboxylic acid have the same general (-COOH). A carboxylic acid is an ester derived from a carboxylic acid.

Hence option (1) is the answer.

2. Identify the compound that exhibits tautomerism:-

- (1) 2-Pentanone
- (2) Phenol
- (3) 2-Butene
- (4) Lactic acid

Solution:

The isomers of a compound which differ only in the position of the protons and electrons are called tautomers. Tautomerism is a reaction that involves a simple proton transfer in an intramolecular fashion. 2 pentanone exhibits tautomerism.

Hence option (1) is the answer.

3. Dipole moment is shown by:-

- (1) trans-2, 3-dichloro- 2-butene
- (2) 1, 2-dichlorobenzene
- (3) 1, 4-dichlorobenzene
- (4) trans-1, 2-dinitroethene

Solution:

The two dipoles in 1, 2-dichlorobenzene are unsymmetric. So it possesses a dipole moment.

Hence option (2) is the answer.

4. The alkene that exhibits geometrical isomerism is:-

- (1) 2-butene
- (2) 2-methyl-2-butene
- (3) Propene
- (4) 2-methylpropene

Solution:

The compounds which have the same molecular formula but differ in the relative spatial arrangement of atoms or groups in space are known as geometrical isomers. This phenomenon is called geometrical

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isomerism. 2-butene exists as cis or trans. It exhibits geometric isomerism because of restricted rotation around the double bond.

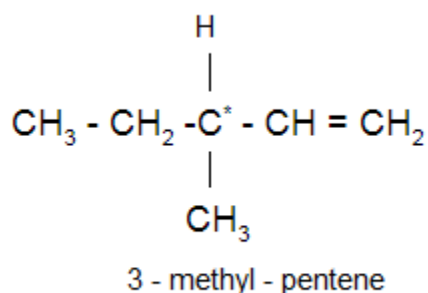
Hence option (1) is the answer.

5. Out of the following, the alkene that exhibits optical isomerism is:

- (1) 2-methyl-2-pentene
- (2) 3-methyl-2-pentene
- (3) 4-methyl-1-pentene
- (4) 3-methyl-1-pentene

Solution:

Two compounds which contain the same number and kinds of atoms, and bonds and different spatial arrangements of the atoms, but have non-superimposable mirror images are called optical isomers. Optical isomers can occur when there is an asymmetric carbon atom. It forms a chiral centre of the molecule. 3-methyl-1-pentene shows optical isomerism.



Hence option (4) is the answer.

6. Which of the following does not show geometrical isomerism?

- (1) 1, 2-dichloro - 1 - pentene
- (2) 1, 3 - dichloro - 2 - pentene
- (3) 1, 1 - dichloro - 1 - pentene
- (4) 1, 4 - dichloro - 2 - pentene

Solution:

1, 1- dichloro-1- pentene does not show geometrical isomerism because of the unsymmetrical alkene.

Hence option (3) is the answer.

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7. A similarity between optical and geometrical isomerism is that

- (1) each forms an equal number of isomers for a given compound
- (2) If in a compound one is present then so is the other
- (3) both are included in stereoisomerism
- (4) they have no similarity

Solution:

Optical and geometrical isomerism is included in stereoisomerism. Hence option (3) is the answer.

8. Racemic mixture is formed by mixing two

- (1) isomeric compounds
- (2) chiral compounds
- (3) meso compounds
- (4) optical isomers

Solution:

Racemic mixture is formed when d and l forms of optical isomers are mixed in equimolar proportion. Hence option (4) is the answer.

9. Which of the following will have meso-isomer also?

- (1) 2- chlorobutane
- (2) 2- hydroxypropanoic acid
- (3) 2,3- dichloropentane
- (4) 2-3- dichlorobutane

Solution:

2-3- dichlorobutane has 2 chiral centres and a plane of symmetry. So it will have a meso isomer. Hence option (4) is the answer.

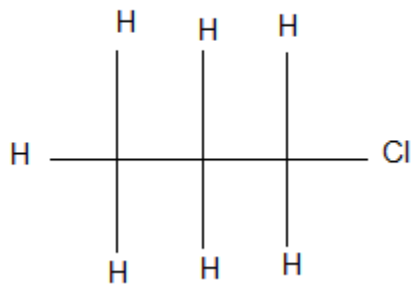
10. Which of the following compounds is not chiral?

- (1) 1-chloropentane
- (2) 3-chloro-2-methyl pentane
- (3) 1-chloro -2-methyl pentane
- (4) 2-chloropentane

Solution:

A chiral molecule is a type of molecule that has a non-superimposable mirror image.

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1-chloropentane is not a chiral compound.
Hence option (1) is the answer.

11. Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is

- (1) n-hexane
- (2) 2, 3-dimethylbutane
- (3) 2, 2-dimethylbutane
- (4) 2- methylpentane

Solution:

The isomeric hexane should have two different types of H atoms and four similar types of H atoms to give two monochlorinated products. In 2,3-dimethyl butane, H atoms at positions 'a' and 'b' are the same and 'b' are the same. Thus two positions are available for chlorination.
Hence option (2) is the answer.

12. Which types of isomerism is shown by 2,3-dichlorobutane?

- (1) Diastereo
- (2) Optical
- (3) Geometric
- (4) Structural

Solution:

In 2, 3 dichlorobutane has 2 chiral centres.
The 2nd and 3rd carbons are chiral. They are not superimposable. So it shows optical isomerism.
Hence option (2) is the answer.

13. The alkene that exhibits geometrical isomerism is

- (1) propene
- (2) 2-methylpropene
- (3) 2-butene
- (4) 2-methyl -2-butene

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Solution:

2- butene exhibits geometrical isomerism.

Hence option (3) is the answer.

14. Which one of the following conformations of cyclohexane is chiral?

- (1) Boat
- (2) Twist boat
- (3) Rigid
- (4) Chair

Solution:

The twist boat conformation of cyclohexane is optically active since it does not have any plane of symmetry.

Hence option (2) is the answer.

15. The number of structural isomers for C_6H_{14} is

- (1) 3
- (2) 4
- (3) 5
- (4) 6

Solution:

C_6H_{14} has 5 structural isomers.

Hence option (3) is the answer.