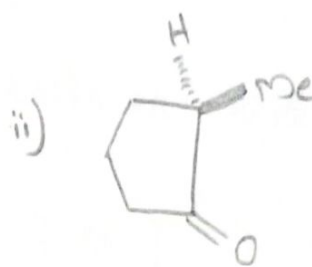
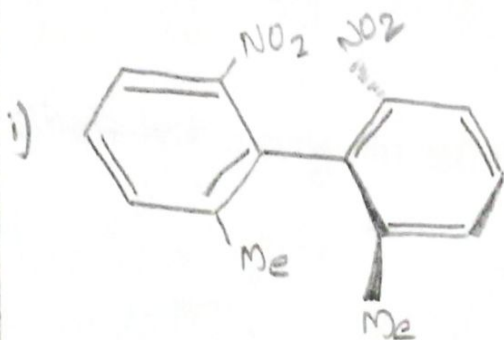


First Semester M.Sc Examination

January 2014

D 53044

1. Determine the configurational descriptors R or S of the following compounds.

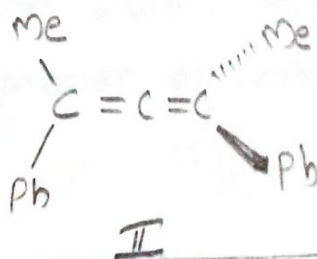
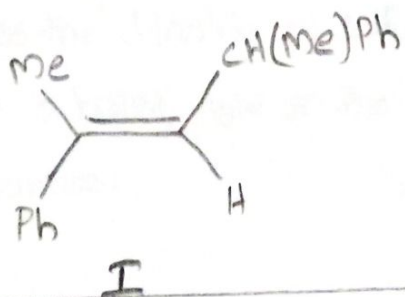


2. $\text{Ph}_2\text{C}=\text{C}=\text{CH}_2$ does not rotate the plane of polarised light whereas $\text{PhCH}=\text{C}=\text{CHPh}$ does; why?
3. Show how chiral allenes be assigned the stereo descriptors R and S based on CIP rules
4. Describe the chirality of nitrogen and explain umbrella effect.

February 2013

D 34019

1. Draw the Fischer projections of the alcohol - $(1R, 2S) - \text{Ph}-\text{CH}(\text{Cl})-\text{CH}(\text{OH})-\text{Me}$.
2. The compound I has a chiral ~~center~~ carbon and hence is optically active, whereas II has no chiral carbon. Still it is optically active; why?



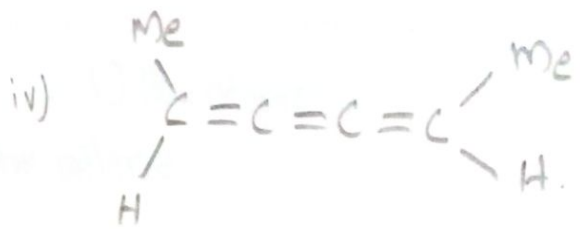
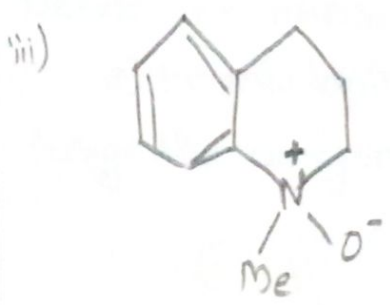
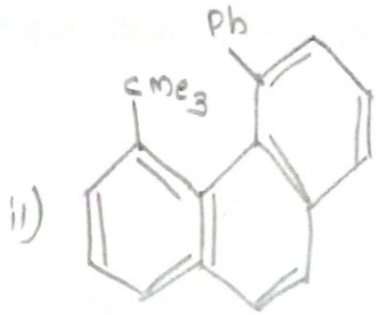
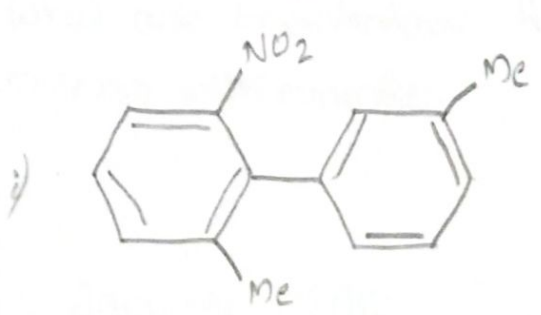
Describe rules based on which optically active allenes are classified as R or S stereoisomers.

Briefly discuss optical activity of biphenyls.

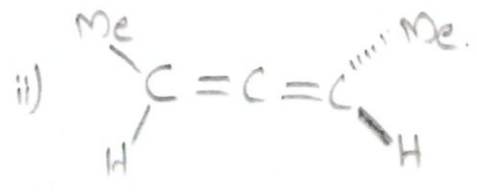
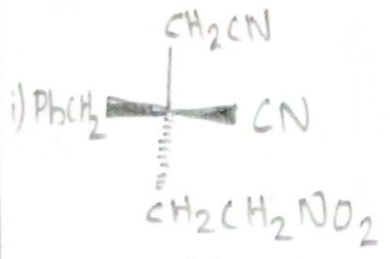
February 2013

D 33395

1. Which one among the following compounds are chiral? Why?



2. Assign R or S configurational notation to the following compounds:

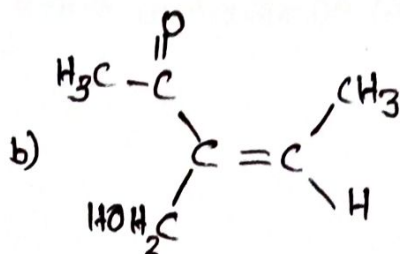
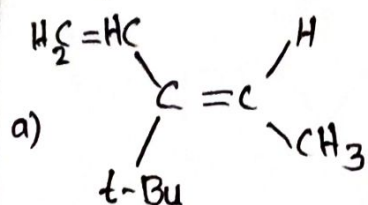


- Discuss the (i) chirality of sulfur compounds and (ii) chirality due to helical shape
- Write a brief note on the stereoisomerism of aldoximes and ketoximes.

January 2012

D 22925

Assign E/Z for the following

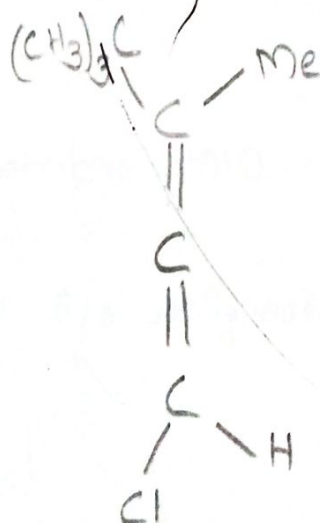


- Discuss the stereochemistry of aldoximes and ketoximes.
- What are Enantiotopic, Homotopic and Diastereotopic hydrogens? Discuss with examples.

January 2012

D 22456

- Define the terms
 - Enantiotopic
 - Homotopic.
- Assign the configuration of the allene

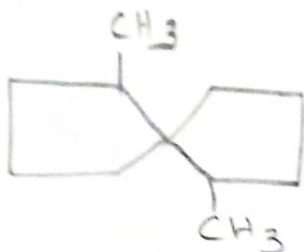


- Discuss optical isomerism in biphenyls and allenes.
- Describe the methods of configuration of geometrical isomerism in a cyclic systems taking two examples.

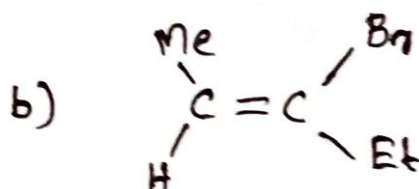
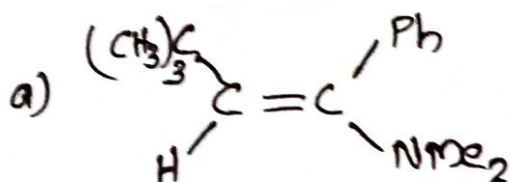
January 2011

D 10862

Draw the cis-cis and cis-trans configuration of the following spiroan.



2. Assign the E or Z notation for the following compounds.



3. Explain the terms with an example.

a) Fischer projection formula

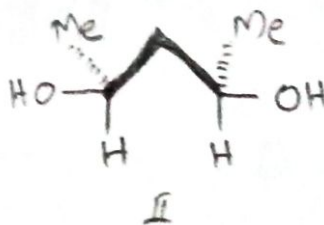
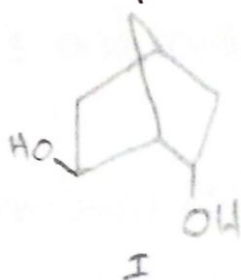
b) Chirality due to folding of helical structures.

4. Discuss the stereochemistry of aldoximes and ketoximes with an example.

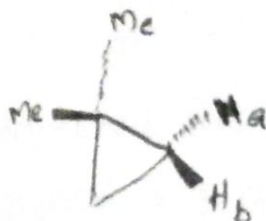
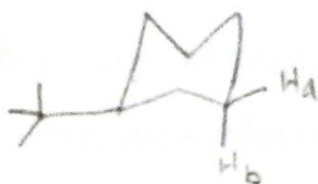
November 2010

D 9371

1. Assign the R/S configuration to each of the stereogenic centres in 1 and 2.



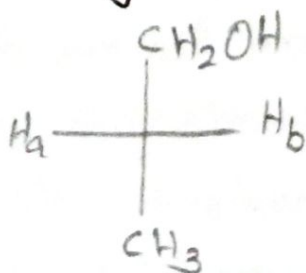
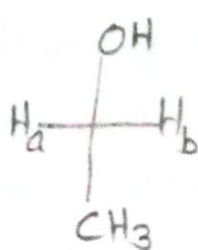
What do you mean by a prochiral centre? In the structures given below predict whether the hydrogens marked H^a and H^b are homotopic, enantiotopic or diastereotopic.



November 2009

D 2035.

1. Label H^a and H^b in the following as enantiotopic, diastereotopic or homotopic.



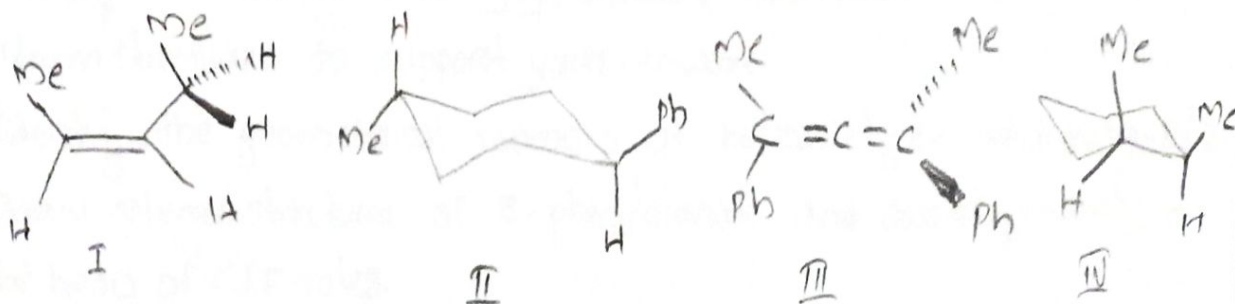
2. With suitable examples discuss geometrical isomerism in alicyclic and cyclic systems. Give the nomenclature for all the possible isomers.
3. What is atropisomerism? Discuss the criteria for optical activity in biphenyls and method of assigning R-S configuration to biphenyls.

December 2009

D 2035 A.

1. Draw the Fischer projections of (i) (1S,2S)-Me-CH(OH)CHBr-Br (ii) its enantiomer and (iii) its diastereomer.

Among the following compounds, which ones would rotate plane of polarised light in solution?



- Describe the substitution pattern required for allenes to be chiral. How can such allenes be assigned R/S nomenclature?
- Write brief note on atropisomerism of biphenyls.

January 2007

D 28070

- Write the stereoisomers of (1R,2S)- $\text{H}_2\text{N}-\text{CH}(\text{COOH})-\text{CH}(\text{Me})-\text{CH}_2\text{Me}$ and any of its diastereomers using Fischer projection.
- Among the following, which one will show optical activity in solution.
 trans-1-bromo-4-methylcyclohexane, trans-cyclooctane,
 $\text{Me}-\text{C}=\text{C}=\text{C}-\text{Me}$, cis-1,3-dichlorocyclohexane
- Describe the atropisomerism due to restricted rotation in biphenyls.

January 2007

D 27897

- Can trans-2,3-dimethyloxirane exhibit optical activity.
- Label enantiotopic and homotopic hydrogens in ethyl bromide.
- Draw the structures of R and S isomers of 6,2'-diiodobiphenyl-1,2-carboxylic acid.

January 2006

D-12479.

Identify if 1-bromo-1-methylcyclohexane has chiral centers. Draw stereoisomers to support your answer.

2. Identify the geometrical isomers of benzaldehyde and assign E/Z.
3. Draw stereoisomer of S-phenylalanine and award priority on the basis of CIP rules.

January 2006

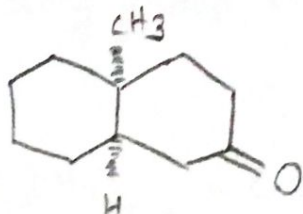
D 12684

1. Use Fischer projection to depict the stereoisomer of S-serine ($\text{H}_2\text{N}-\text{CH}(\text{COOH})-\text{CH}_2-\text{OH}$) and convert it into a Newman projection.
2. Identify the stereoisomers possible for (i) $\text{PhHC}=\text{CH}-\text{CH}(\text{Ph})-\text{Me}$ and (ii) dichloroallene.
3. Explain the steps in the R/S nomenclature of chiral alkenes with example.
4. Discuss with examples chirality in organic compounds originating from molecular shape.

January 2005

D 2672.

1. Write R/S notation to the chiral carbons.



Define prochiral centers. Identify prochiral hydrogens in ethanol. Unlike 1-butylamine, 2-butylamine can be resolved in enantiomers? Why.
A Explain the origin of optical activity in some helixenes.

April 2004

C 35875.

1. Explain how 2,2'-diisopropylbiphenyl can exhibit optical activity.
2. Write stable structure for acetophenone oxime and define E/Z nomenclature.
3. Write an account of the rules governing E/Z nomenclature.

April 2003

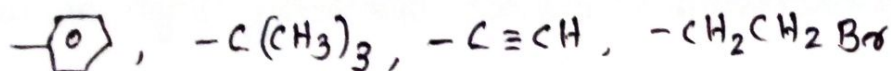
C 26222.

1. Hexahelicene and trans-cyclooctane ~~is~~ both are optically active despite the fact that they do not possess chiral carbon. Why?
2. Which are the isomers possible for dichlorocyclohexane? Which of these are optically active?
3. Write briefly on atropisomerism.
4. Give an account of the optical isomerism in nitrogen compounds.

February 2002

D 24095.

1. Arrange the following group in the order of priority in sequence rule, Explain.



Assign absolute configuration for the asymmetric carbons using R/S notation.

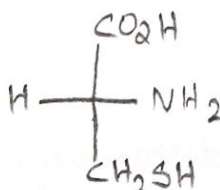
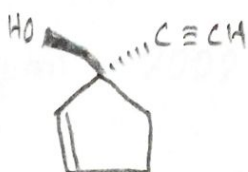


3. Explain why optically active biphenyl derivatives undergo racemisation on heating more easily than compounds containing asymmetric carbon.
4. Draw the structures of the isomers of benzaldehyde oxime.
5. Explain why cis-1,3-dimethylcyclohexane is more stable than its trans isomer although trans-1,2-dimethylcyclohexane is more stable than its cis isomer.
6. What are the different kinds of molecules that show optical activity? Discuss giving examples?

December 2003

D 31259.

1. How do changes in concentration and temperature affect the specific rotation of optically active compounds?
2. Assign R/S notations.



3. What is a prochiral centre, explain with examples.
4. Draw the structure of (2E, 4Z) heptadiene.
5. How can alicyclic geometrical isomers be interconverted? Give examples?

Draw the structures of two compounds with alternate axis of symmetry. Are they optically active?

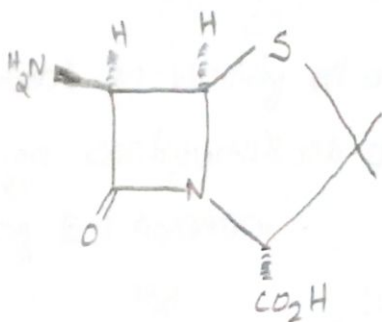
6. Are they ~~prochiral~~ chiral

7. Write a brief account of atropisomerism and show the absolute configurations are assigned for these systems using R,S notation
8. Briefly write on the optical isomerism of N and S compounds.

February 2002

C-18072.

1. What are the isomers of acetophenone oxime? Suggest a method to distinguish them.
2. Assign R/S notation for the asymmetric atoms.

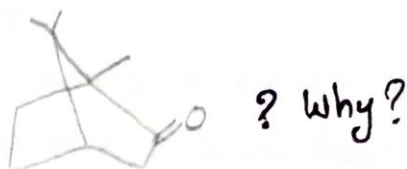


3. Why are optically active biphenyls easily racemised on heating?

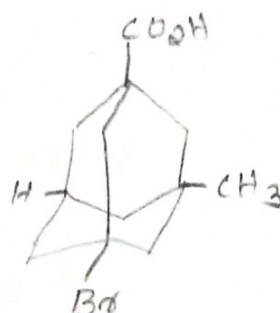
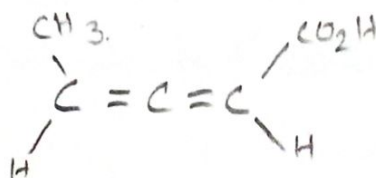
April 2002

C-19163

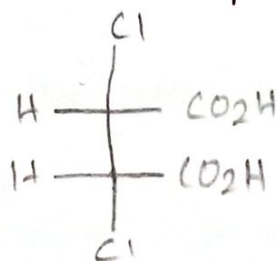
1. How many optical isomers are possible for



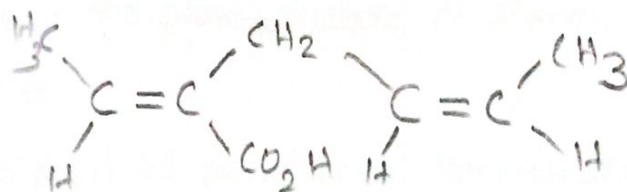
Which of the following show optical activity? Justify your answers.



3. Assign R and S configurations for the asymmetric atoms in the following molecule? Does it exhibit optical activity?



4. Comment on chirality ~~of~~ and optical activity of N-methylaniline.
 5. Assign configurations of the double bonds of the following molecule using E, Z notation.



6. How would you distinguish maleic acid and fumaric acid using chemical method.
 7. Discuss the optical activity of biphenyls and explain how the configurations of biphenyl derivatives assigned using R and S notation.

April 2002

C 19159.

1. Three stereoisomers are possible for 1,2-dimethylcyclopentane. Depict their conformation and identify those which are optically active.

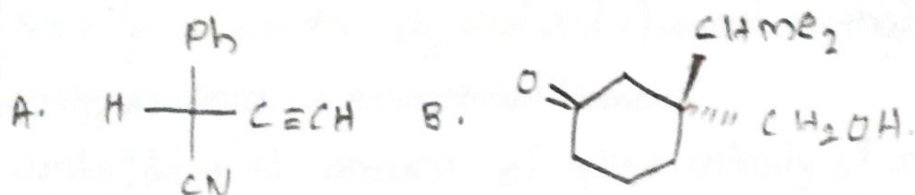
Outline the rules used to assign the stereodescriptors R or S to allenes of known structure.

Describe the structural factors that lead to atropisomerism in biphenyls

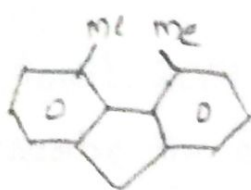
April 2001

C 12962.

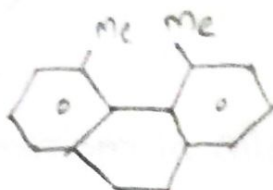
1. Assign R or S stereodescriptors to A and B



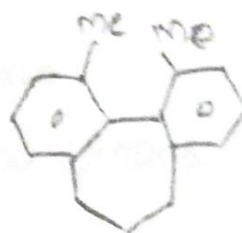
2. Comment on the optical activity, if any of A, B and C.



A



B



C

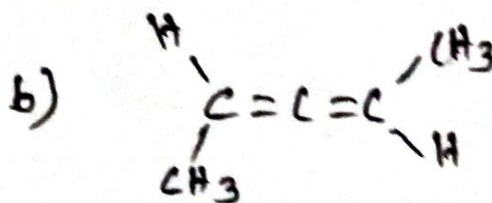
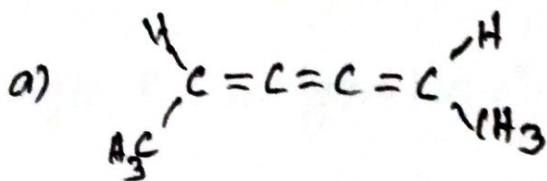
3. Explain how the stereostructure of allenes can be specified according to CIP rules

4. Give an account of geometrical isomerism and optical isomerism in dichlorocyclohexanes

April 2001

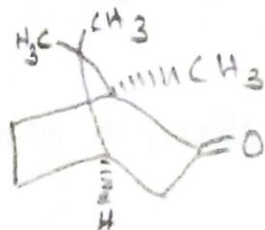
C 12958

1. What type of isomerism is exhibited by the following compounds? Explain



Draw the stable conformation of cis-1,2-dibromocyclohexane, comment on its optical activity.

3. Assign R or S notation.



4. Draw the different isomers of altophenone oximes assign the stereochemistry using E, Z notation.
5. Briefly discuss the physical and chemical methods for determining the configurations of geometrical isomers.
6. Write a detailed account of optical activity of compounds having no asymmetric carbon.

April 2001

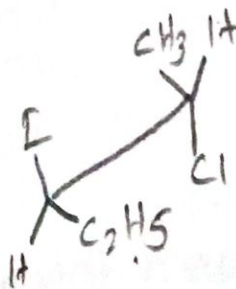
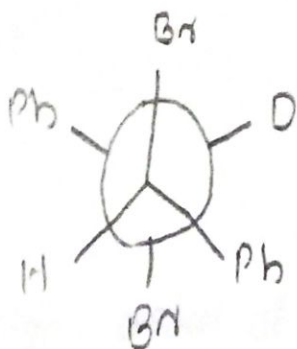
C 12819

1. Describe the optical isomerism in allenes and spiranes.

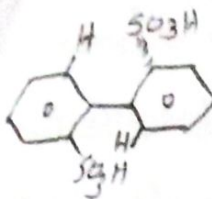
April 2000

L 1722.

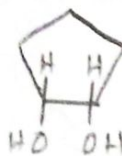
1. Give Fischer projection of the following.



2. Assign R, S configuration.



3. Name the following compounds as meso or dl.

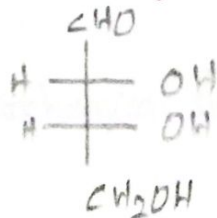


4. Write a brief note on optical isomerism due to nitrogen and sulphur compounds.
5. What is the need for E,Z notation? State how will you proceed to label a tetrasubstituted olefinic compound either as Z or as E.
6. Discuss the optical isomerism exhibited by 1,2; 1,3; and 1,4 dimethylcyclohexanes

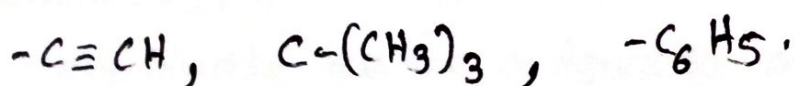
April 2000

C 1584.

1. Assign the absolute configurations of the asymmetric carbon atoms of



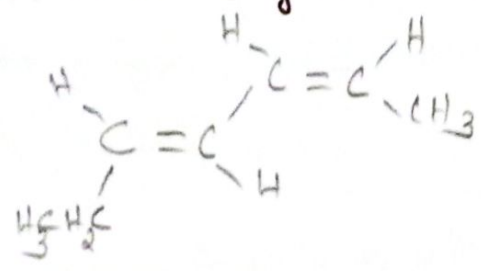
2. Assign order of priority giving reasons.



Give examples of compounds showing optical activity.

- (i) substituted biphenyls.
- (ii) compounds of helical nature.

4. Give the complete name of the compound indicating the stereochemistry of double bonds using E, Z notations.



5. Briefly discuss the optical activity of compounds containing asymmetric N and S atoms.

✍

April 1999

C 5981.

1. How can ~~you~~ the configuration of chiral allenes be specified by CIP system
2. What is pyramidal inversion and what is its consequence.
3. Discuss optical and geometrical isomerism of 1,2-disubstituted cyclohexanes

April 1998

C 1989.

1. What is the stereochemical structure of 2R, 3S-tartaric acid? Is it optically active.
2. How many geometrical isomers are possible for 2,3,4-heptatriene? Does it show optical activity?
3. Dextrorotatory R-2-methylbutan-1-ol was converted to levorotatory R-2-methylchloride. Has the configuration at the chiral centre changed? Explain?

What is the structure of natural rubber? Specify the stereochemistry of the double bond in it using the Z/E system.

April 1997

C 31108

- Write the configuration of S-alanine ($\text{Me}-\underset{\text{NH}_2}{\underset{|}{\text{CH}}}-\text{COOH}$) and R-cysteine ($\text{HS}-\text{CH}_2-\underset{\text{NH}_2}{\underset{|}{\text{CH}}}-\text{COOH}$)
- Explain the term chirality and with examples show how it could arise due to molecular shape.
- Discuss the optical isomerism of compounds not containing a chiral carbon.

April 1996

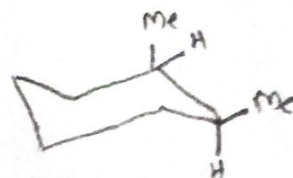
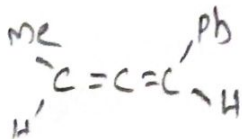
C 26409.

- Draw the structure of the following molecules.
 (a) (2R,3R) Tartaric acid (b) Z-3-methyl-2-pentene.
- Are the following compounds chiral or not?
 a) 2,3-pentadiene.
 b) cis-1,2-dimethylcyclobutane.
- Suggest a sequence of reactions to establish whether a newly discovered optically active compound ($\text{R}-\underset{\text{alcohol}}{\text{CH}}(\text{COOH})-\text{R}'$) and a known optically active alcohol $\text{R}-\text{CH}(\text{OH})-\text{R}'$ have the same configuration.

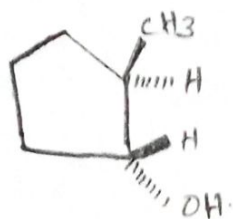
April 1995

18116

- Which of the following are optically active.



Discuss the application of R and S notation to optically active biphenyls.
 Classify the chiral centres as R or S.

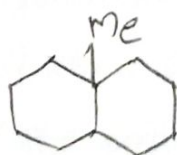


April 1995

18112

1. Draw the R-configuration of $\text{CH}_3-\text{CH}(\text{NH}_2)-\text{COOH}$ and S-configuration of $\text{HOCH}_2-\text{CHOH}-\text{CHO}$.

2. Draw the preferred conformations of the diastereomers of



3. Draw the E and Z configurations of $\text{H}_3\text{C}_2-\text{CH}=\text{CH}-\text{CH}_3$ and write their systematic names.

4. Draw the Fischer projections of the isomers possible for $\text{CH}_3\text{CHOH}-\text{CHBr}-\text{CH}_3$.

5. Write a note on stereochemistry of biphenyl and its derivatives.

April 1995

C 17988.

1. Draw the Fischer projections of the optical isomers possible for $\text{Ph}-\text{CHBr}-\text{CHBr}-\text{Ph}$ and label the active and inactive forms.

2. Draw the R-configuration of $\text{H}_3\text{C}_2-\text{CH}(\text{NH}_2)-\text{COOH}$ and S-configuration of $\text{H}_3\text{C}_2-\text{CH}(\text{CH}_3)-\text{CH}_2\text{Cl}$.

18
April 1994

634

Draw the structures of the following molecules

- R,R -2,3,4-trihydroxybutanal.
 - 3-methylhexa-2E,4Z-diene.
- Represent all the stereoisomers of 2,3-dibromobutane and designate the configurations of the asymmetric centres by R,S-notation.
 - Give an account of optical activity of diphenyls and spirans

April 1993

C 6045.

- Draw the conformation of D-erythrose and designate the absolute configurations of the asymmetric centres by R,S-notation.
- (a) Draw the structure of Z-3-methyl-2-pentene.
(b) Represent the product formed by the addition of bromine to cis-2-butene by Newman projection.
- Why is trans-cyclooctene capable of optical activity? Is trans-cyclodecene also capable of optical activity. Explain.
- Are the following molecules achiral? Explain.
 - cis-1,2-dimethylcyclohexane
 - trans-1,2-dimethylcyclohexane.

April 1993

C 5938

- Draw the 3-D structures of the following.
 - (a) 2R,3S-2,3-dibromopentane.
 - (b) R-2,2'-dinitro-6,6'-dicarboxy biphenyl.

1. Are the molecules capable of being resolved into optical isomers
Give reasons

a) Methyl-p-tolyl sulfide ($\text{CH}_3\text{-SO-C}_6\text{H}_4\text{-CH}_3$)

b) N-methyl-N-ethyl aniline.

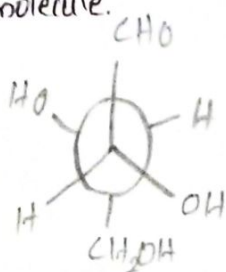
3. Briefly explain optical activity of compounds not containing asymmetric carbon.

May 1991

C 5762.

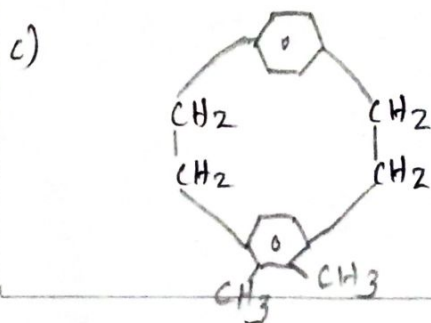
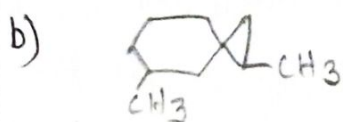
1. a) Draw the configuration of the following molecule in Fischer projection - R,R-2,3-dibromopentane.

b) Deduce the absolute configuration of the asymmetric centers in the following molecule.



2. Decide which of the following molecules are chiral.

a) $\text{CH}_3\text{-CH=C=CH-CH}_3$



May 1990

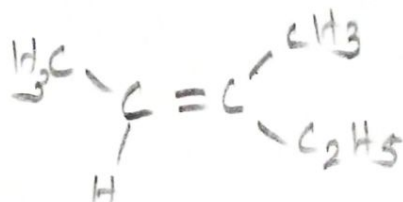
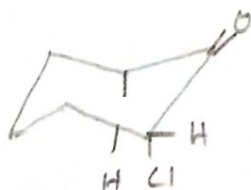
C 1637

- Draw projection formula to show the absolute configurations of the following:-
 - R-2-bromopentane.
 - R,S-2,3-pentanediol.
- Write a note on optical isomerism in biphenyls.

May 1990

C 1515

- Indicate the absolute configurations of the following, using R/S or Z/E notation:-



- How can the E and Z isomers of stilbene ($C_6H_5-CH=CH-C_6H_5$) be distinguished from each other by methods other than melting point?
- Explain the nature of optical isomerism in the following compounds:
 - Hexahelicene.
 - trans-cyclooctane.
 - 2,3-pentadiene.

June 1989

C 23476

1. Assign absolute configurations for the molecules containing asymmetric centres.



2. Name the following structures using the E, Z notation:-

