**QUESTION BANK**

**V SEMESTER
PAPER V (ORGANIC CHEMISTRY)**

**STEREO CHEMISTRY**

**TWO MARKS:**

1. Define optical activity. Give one example of an optically active compound.
2. What is the condition for a molecule to exhibit optical activity?
3. Define the term molecular Chirality.
4. Define the term chiral centre.
5. What are enantiomers? Give an example.
6. Name any two elements of symmetry.
7. Define plane of symmetry.
8. Define centre of symmetry.
9. Define alternating axis of symmetry.
10. Meso tartaric acid is optically inactive although it contains two stereogenic centers. Why?
11. Explain the term racemic mixture with a suitable example.
12. Explain the term meso form with a suitable example.
13. Explain the term resolution with a suitable example.
14. Explain the term racemisation with a suitable example.
15. Explain the term racemic mixture with a suitable example.
16. How many optical isomers are possible for a compound having n number of chiral centers? Give an example.
17. What is the difference between racemic tartaric acid and meso tartaric acid?
18. Explain the biochemical resolution of a racemic mixture.
19. Write any two differences between enantiomers and diastereomers.
20. Write the Fischer projection structure for (I) R and S-hydroxypropanoic acid (ii)R and S 2- chlorobutane.
21. What is geometrical isomerism? Give an example.
22. Show that maleic acid is the cis isomer and fumaric acid is the trans isomer.
23. Write the E and Z configurations of 1-bromo, 1-chloro propene.
24. Explain geometric isomerism in oximes.

**FOUR MARKS:**

1. What is resolution? Explain the biochemical method used for the resolution of a racemic mixture.
2. What is resolution? Explain the chemical method used for the resolution of a racemic mixture.
3. Explain optical isomerism in biphenyl derivatives.
4. Write the geometric isomers of 1, 3-dimethylcyclohexane.Which form is more stable and why?
5. Discuss the stereochemistry of lactic acid.
6. Discuss the stereochemistry of lactic acid.
7. Explain optical isomerism in tartaric acid.
8. Write the R and S configurations of the following compounds (I) 1-bromo, 1- chloroethane (ii) bromochloroacetic acid.
9. What are erythro and threo isomers? Give one example for each.

**HETEROCYCLIC COMPOUNDS**

 **TWO MARKS:**

1. Give one method for the preparation of pyrrole .Write the equation.
2. Give one method for the preparation of thiophene. Write the equation.
3. Give one method for the preparation of furan. Write the equation.
4. Write the structure of Quinoline.
5. Write the structure of isoquinoline.
6. Explain Chichibabin reaction.
7. Compare the basicity of pyrrole and pyridine.
8. Give one reaction to show that furan undergoes electrophilic substitution reaction.
9. How is acetylene converted into (i) pyrrole (ii) pyridine.
10. Explain pyridine is more basic than pyrrole.
11. How is pyrrole prepared from acetylene?
12. How is pyrrole prepared from ammonium mucate?
13. How is thiophene prepared from acetylene?
14. How is thiophene prepared from butane?
15. How is furan prepared from furfural?
16. How is furan prepared from mucic acid?
17. How is pyridine prepared from acetylene?
18. How is pyridine prepared from nicotinic acid?
19. Explain nitration reaction of pyrrole.
20. Explain nitration reaction of furan?
21. Explain nitration reaction of thiophene?
22. Explain nitration reaction of pyridine?
23. Explain nitration reaction of Quinoline?
24. Explain nitration reaction of indole?

 **FOUR MARKS:**

1. Explain aromaticity of furan using molecular orbital theory.
2. Explain aromaticity of thiophene using molecular orbital theory.
3. Explain aromaticity of pyrrole using molecular orbital theory.
4. Describe Skraup’s synthesis of Quinoline.
5. Describe Fisher synthesis of indole.

**INDUSTRIAL ORGANIC CHEMISTRY-DYES**

 **TWO MARKS:**

1. Explain the term auxochromes with an example.
2. Explain the term chromophores with an example.
3. What is a mordant?
4. What are vat dyes? Give an example.
5. Although azobenzene is a coloured compound, it is not a dye. Explain.
6. Write the structure of alizarin.
7. Write the structure of congo red.
8. Write the structure of malachite green.
9. Write the structure of indigo.
10. What is a white dye?
11. Name the chromophores and auxochromes present in malachite green.
12. What is a disperse dye?
13. What are brighteners?
14. What is a direct dye? Give an example.

 **FOUR MARKS:**

1. Describe the synthesis of indigo with equations.
2. Describe the synthesis of malachite green with equations.
3. Describe the synthesis of alizarin with equations.
4. Describe the synthesis of Congo red with equations.

**STEREOCHEMISTRY**

**Questions carry two marks:**

1. What is molecular chirality?
2. What is a meso compound? Give an example.
3. A meso compound cannot be resolved. Give reasons.
4. What are enantiomers/ give an example.
5. Why is meso tartaric acid optically inactive?
6. What is the property that distinguishes enantiomers?
7. What is geometric isomerism? Give an example.
8. Explain the necessary conditions for geometrical isomerism.
9. Write the R and S configuration of 1-chloro-1-bromoethane.
10. Write E and Z configuration of formic acid.
11. Write E and Z configuration of 1-bromo-1-chloropropane.
12. Write E and Z configuration of 1-bromo-2-dichloroethane.
13. Write the configuration of L-glyceraldehyde and S-lactic acid
14. Draw the two chair conformations of trans-1, 2-dimethyl cyclohexane. Compare their stability.
15. Mention if the following compounds exhibit optical activity or not: nitro methane and glyceraldehyde.
16. Write the two isomeric forms of 1-Iodo-2-methyl ethane and label them as E and Z.
17. Write the structure of the cis and trans chair conformations of 1, 4-dimethyl cyclohexane and indicate their relative stability.
18. Write the structure of the stereo isomers of butane-dioic acid and assign the configuration according to the E and Z notation.
19. Give the chair conformations of trans 1,3-dimethyl cyclohexane.
20. Write the R and S conformation of 2-chloropentane.
21. Write the R and S configuration of transdecalin.
22. Write the E and Z isomers of 2-chloro-1-propenol.
23. Draw the two chair conformations of trans-1, 2-dimethyl………..
24. The equatorial chair conformation of trans-1, 2-dimethyl cyclohexane. Compare their stability.

**Questions carry Four marks:**

1. What is stereoisomerism? Mention the two types of stereo isomerism you have studied.
2. What is a plane of symmetry? What is its effect on the optical property of a compound? Explain with example.
3. What is optical isomerism? What are the conditions for a molecule to exhibit optical isomerism?
4. What is racemic mixture? How is it resolved by chemical method?
5. Write the structures of all the sterioisomeric forms of tartaric acid? Classify them into enantiomers and diasterioisomers.
6. What are the conditions for biphenyl derivatives to exhibit optical activity? How is their optical activity explained?
7. What is resolution? What are the advantages of biochemical methods of resolution?
8. Mention the main disadvantages of the biochemical methods of resolution.
9. What is the advantage of R and S notation over D and L notation? Explain.
10. Explain why o-o` disubstituted biphenyl are optically active even though they do not contain chiral carbon atom.
11. How do you show that malic acid is a cis isomer and formic acid is a trans isomer?
12. Explain geometric isomerism in oximes.

**AMINES**

**Questions carry two marks:**

1. Explain why
2. Methyl amine is more basic than ammonia.
3. Di methyl amine is more basic than methyl amine.
4. Tri methyl amine is less basic than di methyl amine or methylamine.
5. What happens when benzene diazonium chloride is treated with sodium sulphite or stannous chloride?
6. How are the following conversions bought about?
7. Acetaldehyde to ethyl amine?
8. Benzene diazonium chloride to chlorobenzene?
9. What happens when aniline is warmed with acetyl chloride? Give equation.
10. Write the structural formula of p - hydroxyazo benzene.
11. Describe Hinsberg’s test to distinguish between a primary, secondary and tertiary amine.
12. What happens when aniline is warmed with acetyl chloride?
13. Explain Sand Mayer’s reaction.
14. Discuss the synthetic application of benzene diazonium chloride.
15. How is methyl amine prepared by Gabrialphthalamide synthesis?
16. How is methyl amine prepared by Hofmann bromide reaction?

**Questions carry Four marks:**

1. How will YOu distinguish between primary, secondary and tertiary amines?
2. Arrange the following compounds in order of increasing basic strength. Give reason.

a) NH3: b)CH3NH2: c) (CH3)2NH: d) (CH3)3N:

1. Write a note on diazotization.
2. Write a note on complete reactions of benzene diazonium chloride.
3. How is nitrous acid used to distinguish between primary, secondary and tertiary amines?