



Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, February 2022

First Degree Programme under CBCSS

Chemistry

Core Course

CH 1441: ORGANIC CHEMISTRY I

(2019 Admission)

Special Examination

Time : 3 Hours

Max. Marks : 80

SECTION - A

Answer **all** questions. Answer in **one** word to maximum **two** sentences. Each question carries **1** mark.

1. Give an example of an electrophile and nucleophile.
2. Give the secondary suffix name of the following groups:
 - (a) $-\text{COOH}$,
 - (b) $-\text{COCl}$
3. Explain homolysis and heterolysis with examples.
4. What is electromeric effect?
5. Phenol is acidic or basic? Explain the reason.

P.T.O.



6. Propene on addition with HBr in presence of peroxide gives?
7. What is a chiral carbon?
8. Explain centre of symmetry.
9. Draw the structure of Malachite green.
10. Write the structure of a non benzenoid molecule obeying Huckel's rule.

(10 × 1 = 10 Marks)

SECTION – B

Short answer type. Answer any **eight** questions from the following. **Each** question carries **2** marks.

11. Methylamine is more basic than ammonia. Explain.
12. Distinguish between inductive and electromeric effects.
13. Give the mechanism of unimolecular elimination.
14. What is peroxide effect? Illustrate with an example.
15. What happens when chloro benzene is treated with sodamide in ammonia?
16. Draw the sawhorse projection formulae of ethane.
17. Explain the following:
 - (a) Dihedral angle
 - (b) Torsional strain
18. Draw the stereoisomers of tartaric acid.

19. Explain optical activity in biphenyls.
20. Draw the Fischer projections for all possible stereoisomers of:
- $$\text{C}_6\text{H}_5\text{-CH (NH}_2\text{) COOH}$$
21. How will you synthesize methyl orange?
22. What are chromophores? Explain with an example.
23. Explain Norrish type I process.
24. Explain the reaction between benzene and benzoylchloride in the presence of anhydrous AlCl_3 .
25. Explain the heat of hydrogenation and stability of benzene.
26. Explain the stability of cyclopentadienyl anion according to Huckel's theory.

(8 × 2 = 16 Marks)

SECTION – C

(Short essay type. Answer any **six** questions from the following. Each question carries 4 marks.)

27. Write briefly on
- (a) Substitution
 - (b) Addition
 - (c) Elimination
 - (d) Rearrangement reactions.



28. (a) Give the IUPAC name of the following:
- $\text{H}_3\text{C}-\text{CH}=\text{CH}-\text{CH}(\text{NH}_2)-\text{CH}_2-\text{CHO}$
 - $\text{CH}_3-\text{CH}(\text{CH}_3)-\text{CH}(\text{Cl})-\text{COOH}$
- (b) Give the structural formulae for the following:
- Methyl-5-bromo-3-methylhexanoate
 - 3-Methyl-5-hydroxy -3-hexenal
29. Write a short note on electrometric effect.
30. What are free radicals? How are they formed? Discuss the geometry and relative stabilities.
31. State Markownikoff's rule. Illustrate giving an example.
32. Write an account on Hofmann's elimination.
33. Explain geometric isomerism in maleic and fumaric acids.
34. Explain the difference between diastereomers and enantiomers.
35. Write a note on photodimerization and photosensitization.
36. Give the synthesis and any one application of fluorescein.
37. Write the mechanism for the nitration of benzene.
38. Explain the greater reactivity of α -position compared to β -position towards electrophilic substitution in naphthalene.

(6 × 4 = 24 Marks)

SECTION – D

Answer any two questions. Each question carries 15 marks.

39. (a) Explain hyperconjugation and its significance in explaining the physical and chemical properties of organic molecules.
- (b) What are carbocations and carbanions? How are they formed? Discuss their geometry and relative stabilities. (7.5+7.5 Marks)
40. (a) Give the mechanisms of E1 and E2 reactions?
- (b) Discuss the mechanism, stereochemistry and kinetics of SN_1 and SN_2 reaction for the hydrolysis of alkyl halides. (5+10 Marks)
41. Discuss the conformations of the following organic compounds.
- (a) n-Butane
- (b) Cyclohexane. (7.5+7.5 Marks)
42. (a) What is meant by racemic mixture? What is resolution? Discuss any two methods for resolving a racemic mixture.
- (b) Write a note on chirality and elements of symmetry. (6+9 Marks)
43. (a) Explain the theories to explain relationship between colour and constitution of dyes.
- (b) What are the difference between photochemical reactions and thermal reactions?
- (c) Explain the classification of dyes based on constitution. (5+5+5)



44. (a) Explain why naphthalene is more reactive than benzene.

(b) Discuss the orbital structure of naphthalene.

(c) Elimination addition mechanism.

(6+4+5 Marks)

(2 × 15 = 30 Marks)
