

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, May 2021

First Degree Programme under CBCSS

Chemistry

Core Course

CH 1441: ORGANIC CHEMISTRY I

(2019 Admission Regular)

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 the prefix name of the following:

(a) C_2H_5O- (b) $-CN$

2. What are Cycloaddition reactions?

3. What are pericyclic reactions?

4. What is Walden inversion?

5. Explain diastereomers?

6. Arrange the following groups in the increasing order of their priority as per Cahn Ingold-prelog system

(a) OH (b) CH_2OH (c) CHO (d) H

7. Norrish type I process involve photochemical reactions in which type of compounds?

8. Define resonance energy

9. Explain why nitration of benzene takes place more readily than nitration of nitrobenzene?

10. Explain why $-\text{NH}_2$ group on benzene ring is activating and ortho and para directing?

(10 × 1 = 10 Marks)

SECTION – B

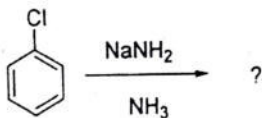
(Short answer type. Answer any **eight** questions from the following. Each question carries **2** marks)

11. Explain by an example the phenomenon of hyperconjugation?

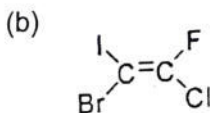
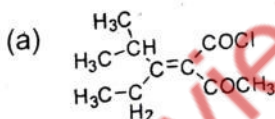
12. What are carbenes and explain the structure of carbenes?

13. Distinguish between inductive and electromeric effects?

14. Give an account on the effect of alkyl group structure and solvent nature on aliphatic nucleophilic substitution reactions by SN1 and SN2 mechanism?
15. Complete the following with mechanism.



16. State Saytzeff's rule and give the major product when 2-chlorobutane is heated with alc.KOH.
17. Define the terms (a) Dihedral angle (b) Torsional strain
18. Explain Sachse Mohr theory.
19. Draw the erythro and threo forms of 3-chloro-2-butanol.
20. Assign E and Z configuration for the following?



21. Explain asymmetric synthesis?
22. Write briefly on Norrish type II process?
23. What are photochemical processes? Explain with an example?
24. What are azo dyes? Give one example?

25. Discuss the orbital structure of benzene.

26. State Huckel's rule and explain the stability of cyclopentadienyl anion?

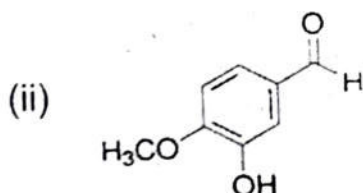
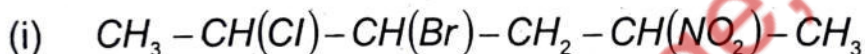
(8 × 2 = 16 Marks)

SECTION – C

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

27. Write an account on Hofmann's elimination?

28. (a) Give the IUPAC name of the following



(b) Give the structural formulae for the following

(i) 3-Ethyl-4-methylpent-2-en-1-al

(ii) 2-Methoxypropan-1-al

29. Write a short note on mesomeric effect?

30. Explain hyperconjugation and its significance in explaining the physical and chemical properties of organic molecules?

31. Explain the mechanism of addition of HBr to 1-propene in presence and absence of peroxide?

32. Give the mechanisms of E1 and E2 reactions?
33. What is meant by racemic mixture? What is resolution? Discuss any two methods for resolving a racemic mixture.
34. Distinguish between diastereomers and enantiomers?
35. How will you convert benzophenone to benzopinacol?
36. Give classification of dyes based on application?
37. Discuss resonance with the help of two examples?
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** question. Each question carries **15** marks)

39. (a) What are carbocations and carbanions? How are they formed? Discuss their geometry and relative stabilities.
- (b) What are free radicals? How they are formed? Discuss the geometry and relative stabilities. (7.5+7.5 Marks)
40. (a) Discuss the mechanism, stereochemistry and kinetics of SN1 and SN2 reaction for the hydrolysis of alkyl halides.
- (b) Write a short note on benzyne mechanism? (10+5 Marks)
41. Discuss the conformations of the following organic compounds
- (a) n-Butane (b) Cyclohexane? (7.5+7.5 Marks)

42. (a) What do the symbols E and Z stand for? Illustrate briefly the E and Z system of naming a pair of geometrical isomers. What are the advantages of E, Z system over the conventional cis-trans system?
- (b) What is racemization? Explain how racemization can be brought about in optically active compounds. **(9+6 Marks)**
43. (a) What are the difference between photochemical reactions and thermal reactions?
- (b) Explain the theories to explain relationship between colour and constitution of dyes?
- (c) Explain the classification of dyes based on constitution? **(5+5+5)**
44. Write the mechanism for
- (a) Nitration of benzene
- (b) Discuss the orbital structure of naphthalene
- (c) Bimolecular displacement reaction **(7+4+4 Marks)**

(2 × 15 = 30 Marks)