(Pages : 4) N – 7777

Reg. No. : .....

Name : .....

Fourth Semester B.Sc. Degree Examination, August 2022

First Degree Programme under CBCSS

Chemistry

Core Course

CH 1441 : ORGANIC CHEMISTRY I

(2013-2016 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

1. Draw the tautomeric form of cyclohexanone.

2. An alkyne with molecular formula C_4H_6 gives a red precipitate with ammoniacal cuprous chloride solution. The alkyne is ————————.

3. What is the hybridisation of carbon in singlet carbene?

4. When 2-bromo-2-methyl butane is warmed with alcoholic KOH, the major product formed is ————————.

5. What is the product obtained when benzene is first methylated in presence of anhydrous $AlCl_3$ and then treated with nitrating mixture?

6. Isopropylbenzene on heating with acidified $K_2Cr_2O_7$, will give ————————.

P.T.O.

7. When propyne is passed through hot dilute H_2SO_4 in the presence of Hg^{2+} catalyst, the product is _____.

8. The energy difference between chair and boat form of cyclohexane is _____ kJ/mol.

9. Number of π electrons in naphthalene is _____.

10. Write the structure of picric acid.

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. **Each** question carries **2** marks.

11. Draw the conformations of methyl cyclohexane. Which is more stable? Why?

12. Draw the Fischer projection for (S)-Glyceraldehyde and (R)-1-Bromopropan-2-ol.

13. What will be the effect of substitution on methyl carbon of acetic acid in its p^{Ka} values?

14. Explain two methods for the resolution of racemic lactic acid into optically active form.

15. Draw the *E* and *Z* forms of 3-bromo-4-chlorohex-3-ene.

16. Explain the possible rearrangement reaction in allyl phenyl ethers.

17. Convert the *(R, R)* tartaric acid to its Newmann projection.

18. Assign *R/S* for each carbon in *D*-Erythrose and *L*-Threose.

19. Explain synthetic applications of organo zinc reagents.

20. Esterification of 2,6-di(*t*-butyl)benzoic acid is difficult compared to benzoic acid. Why?

21. If attached to benzene, -OH group is *o/p* orienting while $-NO_2$ is *meta* directing. Explain.

22. How we can prepare cis-cyclohexane-1, 2-diol from cyclohexene.

(8 × 2 = 16 Marks)

SECTION – C (Short essay)

Answer any **six** questions. **Each** question carries **4** marks.

23. Mechanism of aliphatic nucleophilic substitution can be predicted from stereochemistry of product. Justify.

24. Position of isolated double bonds in alkene chain can be located by chemical methods. How?

25. Prove that thiophene and pyrrole are aromatic.

26. Explain the mechanistic basis of *Markovnikov 's* rule and *Kharasch* effect.

27. Draw the energy diagram for the conformations of *n*-butane.

28. Polarity of solvent will alter the course of S_N1 and S_N2 reaction. Give reasons.

29. In benzene substitution is preferred over addition. Why?

30. Explain the orientation effect of electrophilic substitution in naphthalene.

31. Illustrate the asymmetric synthesis of Naproxen.

(6 × 4 = 24 Marks)

SECTION – D (Essay)

Answer any **two** questions. **Each** question carries **15** marks.

32. (a) Explain the formation of benzyne intermediate. Describe the evidences for that.

(b) How kinetic studies and isotop labelling will help in determining the mechanism of reaction?

(8 + 7 Mark)

33. (a) Describe the mechanism of E1 and E2 reactions.

(b) What are the conditions under which elimination is preferred over substitution?

(10 + 5 Mark)

34. (a) Explain the synthetic applications of ethylacetoacetate and diethylmalonate.

(b) Discuss the synthetic uses of Grignard reagent.

(12 + 3 Mark)

35. (a) Write a note about axial chirality and atrop isomerism.

(b) Explain the theory behind polarimeter.

(10 + 5 Mark)

(2 × 15 = 30 Marks)