



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 5th Semester supplementary Examination, 2021

CEMACOR12T-CHEMISTRY (CC12)

ORGANIC CHEMISTRY-V

Time Allotted: 2 Hours

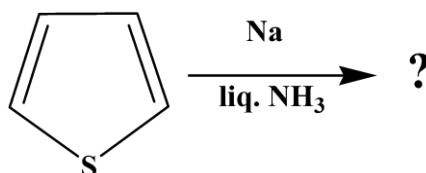
Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

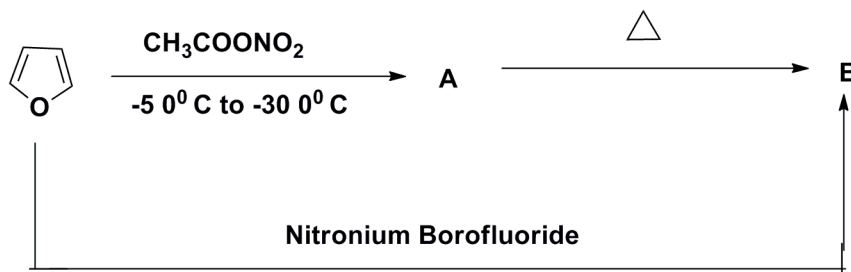
Answer any four questions taking one from each unit

UNIT-I

1. (a) Describe Fischer indole synthesis of 2-methylindole. Write plausible mechanism. 2+1
How would you demonstrate which nitrogen is lost during cyclisation?
- (b) How could you synthesize anthracene starting from naphthalene using Diels Alder reaction as one of the key steps? 2
- (c) Arrange furan, pyrrole and thiophene in order of increasing aromaticity. 2
- (d) Predict the products in the following reaction with plausible mechanism. 3



2. (a) Identify A and B and explain all the steps. 3



- (b) Unlike pyrrole indole undergoes electrophilic substitution at C-3. Explain. 2
- (c) How can you convert toluene into 1,4,6-trimethyl naphthalene? 3
- (d) Compare the basicity of pyrrole and pyridine. 2

UNIT-II

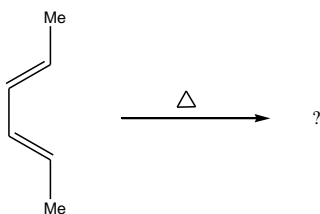
3. (a) Acetolysis of both cis- and trans-tosylate shown below give the same diacetate. Explain. 3



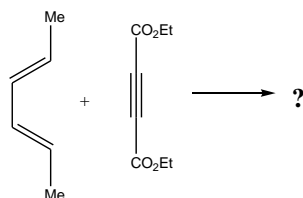
- (b) The cis-1,2-dimethylcyclohexane is less stable than its trans isomer, but cis-1,3-dimethylcyclohexane is more stable than its trans isomer. Draw the most stable conformations of both and explain. 3
4. (a) Compare the rate of hydrolysis of cis and trans isomer of ethyl 4-*t*-butylcyclohexane carboxylate. 3
- (b) Write down the preferred conformation of cis-4-hydroxyl cyclohexane carboxylic acid. What happens when it is heated? 2+1

UNIT-III

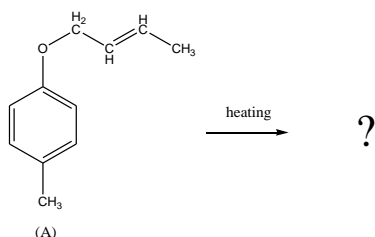
5. (a) Write down the characteristics of pericyclic reaction. 2
- (b) Write down the product of the following reaction. 2



- (c) Dimerisation of cyclopentadiene in thermal condition gives preponderantly the *endo* cycloadduct under kinetically controlled conditions. — Explain. 2
6. (a) Define stereoselectivity of 4 pi system under photochemical and thermal condition. 2
- (b) Write down the product of the following reaction. 2



- (c) What happens when compound A is subjected to heating? 2



UNIT-IV

7. (a) Write down pyranose structure of D – Glucose. 1
- (b) How can you selectively methylate C₃-OH of D-glucose? 2
- (c) E, F and G are the three aldohexoses. E and F yield D-sorbitol when they are catalytically hydrogenated. E and F yield different osazones when treated with excess phenyl hydrazine. F and G give the same osazone but different alditols. Give structures of E, F and G assuming that F and G are D-aldohexoses. 3
- (d) What happens when D- glucose is subjected to HNO₃ oxidation? 2
8. (a) What are epimers? 1
- (b) Describe mutarotation of glucose. 2
- (c) An aldopentose [P] can be oxidized with dil HNO₃ to an optically active aldaric acid. Kiliani- Fisher synthesis starting with [P] gives two new aldoses [Q] and [R]. Aldose [Q] can be oxidized to an optically inactive aldaric acid, but aldose [R] is oxidized to an optically active aldaric acid. Assuming the D-configuration, give the structures of [P], [Q] and [R] and also justify the assignments. 3
- (d) State with mechanism what happens when D-fructose is heated with Tollen's reagent. 2

UNIT-V

9. (a) Write down the steps for the synthesis of a tripeptide Gly-Ala-Phe in the solid phase with the help of Merrifield resin. 3
- (b) Describe Sanger degradation method for N-terminal amino acid determination of peptide. 3
- (c) Between A-T and G-C, hydrogen bonding in which pair is stronger? Why? 2
- (d) RNA undergoes alkaline hydrolysis at a faster rate than DNA. Explain. 2
- 10.(a) Describe synthesis of tripeptide Leu-Val -Pro using chemical method. 3
- (b) Outline the Gabriel synthesis of glycine. 3
- (c) Briefly explain the factors responsible for the stabilisation of a DNA duplex. 2
- (d) Differentiate between nucleosides and nucleotides. 2

N.B. : Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.

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