

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2019 – 20 & thereafter)

B.Sc. DEGREE EXAMINATION, NOVEMBER 2024
BRANCH IV- CHEMISTRY
FIFTH SEMESTER

COURSE : MAJOR CORE
PAPER : ORGANIC CHEMISTRY-III
SUBJECT CODE : 19CH/MC/OC54
TIME : 3 HOURS **MAX.MARKS :100**
SECTION – A **(30x1=30)**

Answer all the questions.

I Choose the correct Answer:

- When aniline is heated with glycerol in the presence of sulphuric acid and nitrobenzene, it gives quinoline. The reaction is called
a) Skraup synthesis b) Fischer synthesis c) Diazodization d) Corey-House synthesis
- Pyridine is basic in nature due to
a) Donates OH⁻ ions b) Donates a lone pair of electrons
c) Accepts a lone pair of electrons d) Donates H⁺ ions
- A silver mirror is formed when glucose is oxidised with
a) Fehling solution b) Molisch reagent c) Tollen's reagent d) Schiff's reagent
- In Hofmann degradation, benzamide is converted into
a) Benzoic acid b) Aniline c) Benzophenone d) Acetaldehyde
- The glucose molecules are connected by a _____ bond in Sucrose
a) β-1,4-glycosidic b) α-1,6- glycosidic c) 1,2- glycosidic d) α-1,4- glycosidic
- Zeisel's method is to determine the number of _____ groups present in an alkaloid.
a). alcoholic b). amino c). alkoxy d). carbonyl
- Ethylene glycol is used to protect _____ functional group.
a) >C = C< b) >C = O c) – COOH d) – OH
- NaBH₄ is a _____ reagent
a) Reducing b) Oxidising c) Acidic d) None of these
- Conversion of Carbonyl to methylene is performed by one of the following reduction processes _____
a) Clemmensen b) MPV c) Birch d) Rosenmund
- The [3,3] sigmatropic rearrangement of 1,5-dienes is called as _____ rearrangement
a) Fries b) Cope c) Claisen d) Hoffmann

II Fill in the blanks:

- Maltose is a _____ sugar.
- The pair of optical isomers which differ in the orientation of H and OH are _____.
- One mole of glucose on oxidation with HIO₄ gives _____ moles of formic acid.
- The end product on hydrolysis of starch is _____.
- Epoxide protection is used to protect _____.
- The rearrangement where there is nitrogen gas loss is _____.
- Nucleophilic substitution of quinoline occurs at _____ position.
- The heterocyclic compound which on reduction with Ni-H₂ undergoes destruction of the ring is _____.
- A freshly prepared solution of glucose has specific rotation of +112⁰ but on keeping for some time it changes to +52.7⁰. This Phenomenon is known as _____.
- Nicotine is the chief alkaloid of _____ plant.

III State whether true or false:

- Iodine reagent is used to distinguish cellulose and starch.
- Furan is reduced by hydrogen in the presence of nickel to produce THF.
- The intermediate formed in Wolf rearrangement is carbene.

24. The simplest carbohydrates that cannot be hydrolysed into simpler carbohydrates, are called disaccharides.
25. Quinoline on oxidation with KMnO_4 yields Quinolinic acid.

IV Answer in a line or two:

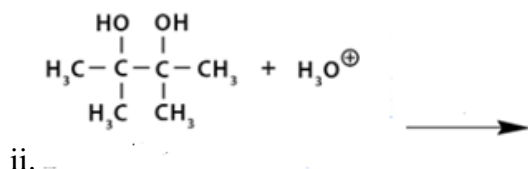
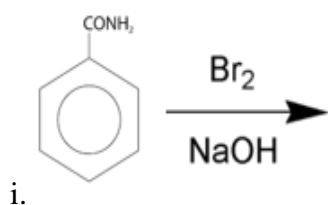
26. Give the pyranose ring structure of glucose.
27. What is mutarotation?
28. State isoprene rule.
29. What is the protecting group for aldehyde?
30. Name the rearrangement in which 1,2-diketones yields α -hydroxycarboxylic acid in the presence of a strong base.

SECTION – B

(5x6=30)

ANSWER ANY FIVE QUESTIONS

31. Outline the synthesis of isoquinoline by Bischler-Napieralsky synthesis.
32. Demonstrate the conversion of glucose to fructose.
33. Evaluate the nucleophilic aromatic substitution reactions of pyridine.
34. Explain the structure of Citral.
35. Predict the product and discuss the mechanism.



36. Explain the aromatic nature of pyrrole and furan with suitable reactions.
37. Discuss the mechanism of Curtius rearrangement with an example.

SECTION – C

(2x20=40)

ANSWER ANY TWO QUESTIONS

38. a) Starting from the open chain structure of D-Glucose, how would you establish the cyclic ring structure
- b) Differentiate with a suitable chemical reaction glucose and fructose
- c) Discuss the mechanism of the following molecular rearrangements
- i) Benzylic acid ii) Beckmann (8+4+8)
39. a) Elucidate the structure of Nicotine. Confirm the same by its synthesis
- b) How will you protect the following functional groups?
- i) $-\text{NH}_2$ ii) $-\text{OH}$ iii) $>\text{C}=\text{O}$ iv) $-\text{COOH}$ (10+10)
40. a) Explain the exhaustive methylation method of degradation of an alkaloid
- b) Compare the structure of Indigo, Indole and Isatin.
- c) Discuss the Claisen and Fries rearrangement giving evidence for intramolecular rearrangement and allylic carbon attachment (5+5+10)