

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

**B.Sc. DEGREE EXAMINATION, NOVEMBER 2023**  
**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:**

- Pyridine is basic in nature due to  
(a) Donates OH<sup>-</sup> ions (b) Donates a lone pair of electrons  
(c) Accepts a lone pair of electrons (d) Donates H<sup>+</sup> ions
- Furan is reduced by hydrogen in the presence of nickel to produce  
(a) Hydrofuran (b) Tetrahydrofuran (c) Furoic acid (d) Furfural
- Osazone is formed when D-glucose reacts with  
(a) Semicarbazide (b) 2,4-Dinitrophenylhydrazine  
(c) Phenylhydrazine (d) Phenylhydrazone
- A silver mirror is formed when glucose is oxidised with  
(a) Fehling solution (b) Tollen's reagent  
(c) Molisch reagent (d) Schiff's reagent
- The carotenoid present in carrot is known as  
(a) Lycopene (b) β-carotene (c) Piperine (d) Turpentine
- The presence of a double bond in α-Pinene is proved by the following  
(a) Elimination of Br<sub>2</sub> (b) Addition of Br<sub>2</sub>  
(c) Elimination of Br (d) Substitution of Br
- The intermediate formed in Wolf rearrangement is  
(a) Benzynes (b) Nitrene (c) Ketene (d) Carbene
- Name the rearrangement in which 1,2-diketones yields α-hydroxycarboxylic acid in the presence of a strong base  
(a) Beckmann (b) Hoffmann (c) Curtius (d) Benzilic acid
- 1,3-dithiane can be used to protect which of the following functional group  
(a) –NH<sub>2</sub> (b) –OH (c) >C=O (d) –COOH
- The functional group transformation of >C=O to >C=CH<sub>2</sub> can be achieved by the following reaction  
(a) Clemmensen (b) Wittig (c) Swern (d) None of the above

**II Fill in the blanks:**

- Isatin is 2,3-diketo derivative of \_\_\_\_\_.
- Sucrose is a \_\_\_\_\_ sugar.
- The chlorophyll has \_\_\_\_\_ as the central metal ion.
- The enzyme responsible for the hydrolysis of maltose into glucose is \_\_\_\_\_.
- The simplest carbohydrates that cannot be hydrolysed into simpler carbohydrates, are called \_\_\_\_\_.
- Nicotine is the chief alkaloid of \_\_\_\_\_ plant.
- Isocyanates on hydrolysis with water gives \_\_\_\_\_ and CO<sub>2</sub>.

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18. In \_\_\_\_\_ rearrangement acyl azide on heating gives isocyanate.  
 19. Acetamide reacts with  $\text{LiAlH}_4$  / Ether to yield \_\_\_\_\_.  
 20. The protecting group for aldehyde is \_\_\_\_\_.

**III State whether true or false:**

21. Quinoline on oxidation with  $\text{KMnO}_4$  yields Quinolinic acid.  
 22. The amylopectin present in starch gives blue colour with iodine.  
 23.  $\alpha$  – terpineol can be prepared from  $\alpha$  – citral.  
 24. In Wolff rearrangement, a diazoketone eliminates  $\text{N}_2$  resulting in a ketene.  
 25. An acidic medium is maintained for Wolf-Kishner reduction.

**IV Answer in a line or two:**

26. Give the oxidation products of  $\alpha$ -Citral with  $\text{KMnO}_4$ .  
 27. What is mutarotation?  
 28. State isoprene rule.  
 29. What is sigmatropic rearrangement?  
 30. Write one method of  $-\text{NH}_2$  protection and deprotection?

**SECTION – B**

**(5x6=30)**

**ANSWER ANY FIVE QUESTIONS**

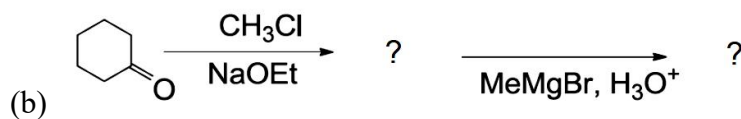
31. Explain with mechanism the Fischer-Indole synthesis.  
 32. How is glucose converted to fructose?  
 33. Discuss about the structural determination of Citral.  
 34. Explain Hoffmann exhaustive methylation taking piperidine as an example.  
 35. Discuss the mechanism of Benzilic acid rearrangement.  
 36. Write any one method for protection and deprotection of  $-\text{COOH}$  and  $-\text{OH}$  functional groups  
 37. Discuss the mechanism of Curtius rearrangement with an example

**SECTION – C**

**(2x20=40)**

**ANSWER ANY TWO QUESTIONS**

38. (a) Write the nucleophilic aromatic substitution reactions of pyridine?  
 (b) How will you obtain glucosazone from glucose?  
 (c) Explain the mechanistic details of the following molecular rearrangements  
 (i) Pinacol–Pinacolone (ii) Beckmann (5+5+10)
39. (a) Explain with mechanism (i) Bischler Napieralsky synthesis (ii) Skraup synthesis.  
 (b) How is the structure of Nicotine elucidated? Confirm the same by its synthesis. (10+10)
40. (a) Discuss the mechanism of (i) Fries rearrangement (ii) Cope rearrangement



- (c) Explain the mechanism of oxidation of ROH with Cr (VI). (10+5+5)

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