

Registration Number:

Date & session:



**ST JOSEPH'S UNIVERSITY, BENGALURU -27**  
**M.Sc. (ORGANIC CHEMISTRY) – III SEMESTER**  
**SEMESTER EXAMINATION: OCTOBER 2023**  
(Examination conducted in November/December 2023)  
**OCH 9323– CHEMISTRY OF HETEROCYCLIC**  
**COMPOUNDS, BIOMOLECULES AND NATURAL PRODUCTS**  
(FOR CURRENT BATCH STUDENTS ONLY)

Time: 2 Hours

Max Marks: 50

This paper contains **TWO** printed pages and **THREE** parts.  
All parts of the question paper are compulsory

**PART-A**

Answer any **EIGHT** of the following questions.

[8x2 = 16]

1. Write the chemical reaction of Fischer Indole synthesis.
2. Arrange pyrrole, furan and thiophene in increasing order of aromaticity. Justify your answer.
3. Write the isomers of 1,2,3-triazole. Which is more stable and why?
4. What are the monosaccharide units found in peptidoglycan?
5. How would you confirm the presence of vinyl group in the structure of quinine?
6. Give an example for nucleophilic substitution reaction of quinoline.
7. How do you determine the number of C-methyl groups present in terpenes?
8. Give an example for carotenoids. How many units are present in it?
9. What is the metal present in vitamin B<sub>12</sub>? What is its oxidation state?
10. Name the ring present in haemin. What is the central metal ion present in it?

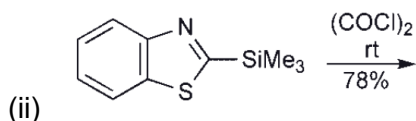
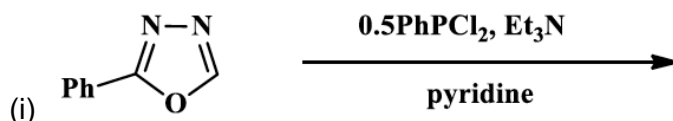
**PART-B**

Answer any **TWO** of the following questions.

[2x12 = 24]

11. (a) Write the steps involved in the synthesis of reserpine.  
(b) Give the synthesis of each of the following.  
(i) furan (ii) pyrimidine  
(c) Complete the following reactions:

(6+4+2)



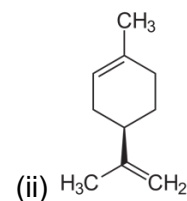
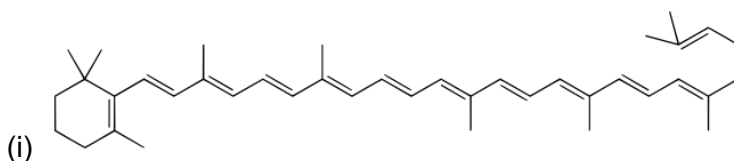
12. (a) Discuss the mechanism for the Pictet-Splengler synthesis of isoquinoline.  
 (b) Write the steps for the solution-phase synthesis of Gly-Val dipeptide.  
 (R = H for glycine; R = *i*-Pr for valine)  
 (c) Give the pathway for the conversion of arachidonic acid to PGE<sub>2</sub>. (3+3+6)
13. (a) Give the synthesis of PGE<sub>2</sub> by Corey's approach starting from 15 S-alcohol.  
 (b) Write the steps involved in the biosynthesis of 3,11-dimethyl-2-nonacosanone.  
 (c) Give the commercial synthesis of camphor from  $\alpha$ - pinene. (4+4+4)

### PART-C

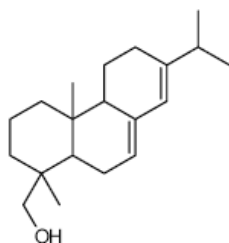
Answer any **TWO** of the following questions.

[2x5 = 10]

14. Predict the role of 1,3-diketones and 1,4-diketones in the synthesis of 5- and 6-membered heterocyclic compounds. Write all the chemical reactions involved.
15. (a) From the below terpenoids, identify the one that doesn't obey special isoprene rule. Justify your answer.

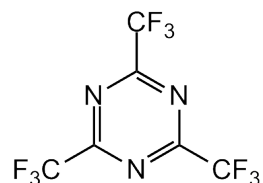


- (b) Write the mechanism of rearrangement of abietinol to methyl abietine.  
 The structure of abietinol is given below.



(2+3)

16. (a) Does sucrose exhibit mutarotation? Explain showing the structure of sucrose.  
 (b) Predict the starting material for the synthesis of following molecule.



(3+2)

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