LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

SIXTH SEMESTER – **NOVEMBER 2023**

UCH 6503 – SYNTHETIC ORGANIC CHEMISTRY AND HETEROCYCLIC COMPOUNDS

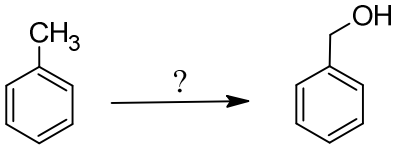
Date: 07-11-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

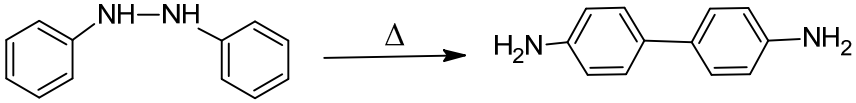
Part-A

Answer ALL questions. **(10 × 2 = 20)**

1. What is the basis for retrosynthetic analysis?
2. Define synthon and synthetic equivalent.
3. Differentiate between Wolf-Kishner and Clemmenson reduction reactions.
4. Suggest a suitable reagent for the following conversion.



5. Predict the type of pericyclic reaction involved in the following conversion.

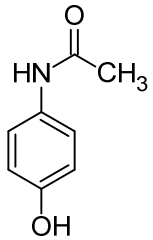


6. Schematically represent Sommlet-Hauser rearrangement.
7. How is pyrrole and thiophene prepared?
8. "Pyrrole is less basic than pyridine". Justify.
9. Give the structure of the following compounds.
   (i) Isoindole (ii) Sulfolane
10. Why does indole undergo electrophilic substitution at C-3 position preferably?

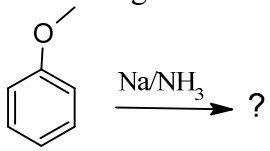
Part-B

Answer any EIGHT questions. **(8 × 5 = 40)**

11. Suggest a synthetic scheme for the drug paracetamol. Validate it.

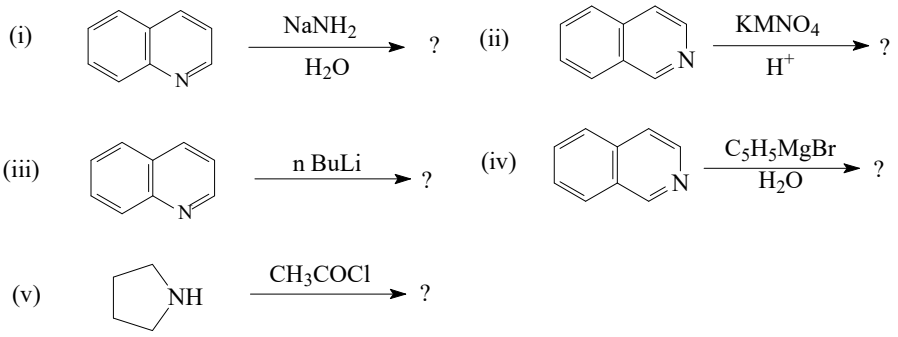


12. Compare the efficiencies of convergent and linear synthesis with suitable example.
13. Identify the product in the given reaction. Account for the formation.



14. Demonstrate the application of organoboron reagents in organic synthesis.
15. Examine the characteristic features of pericyclic reactions.
16. Analyse [4+2] thermal cycloaddition reaction by Frontier Molecular Orbital approach.

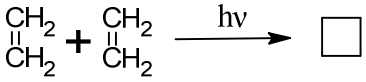
17. Write a note on Cope and Claisen rearrangements.
18. Write the mechanism of Chichibabin reaction and explain its features.
19. Explain the mechanism of the following reactions:
    (i) Nitration of pyrrole (ii) Friedel-Crafts acylation of furan
20. Illustrate the preferable position of an electrophilic substitution of pyridine.
21. Explain the mechanism of Bischler-Napieralski synthesis.
22. Predict the product for the following reactions.



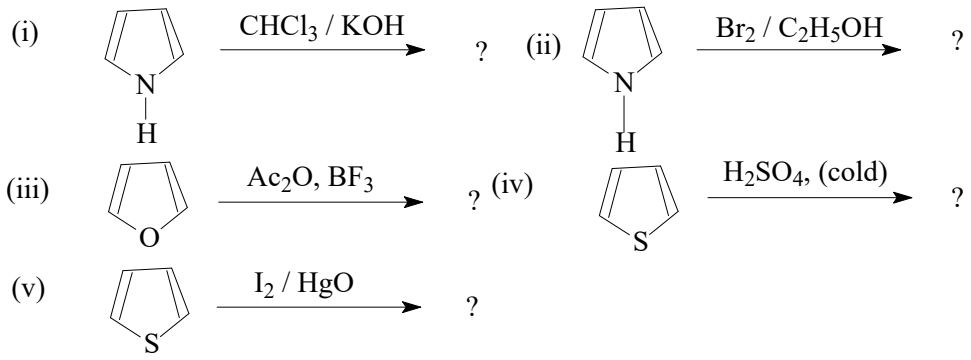
Part-C

Answer any FOUR questions. **(4 × 10 = 40)**

23. a) Design a synthetic scheme based on1,2- and 1,3- C-C disconnection approaches. (5)
    b) Evaluate the application of umpolung approach in organic synthesis. (5)
24. a) Account for the following conversion based on FMO approach. (6+4)



    b) Investigate the electrocyclization reaction of 1,3 butadiene based on FMO approach.
25. a) Write a note on the application of peracids in organic synthesis. (5+5)
    b) Explain the mechanism of any two electrophilic substitution of thiophene.
26. a) Explain the following reactions of pyridine. (2+3)
    (i) Bromination (ii) Nitration
    b) Predict the product. (5x1)



27. a) Explain the mechanism of Skraup synthesis of quinoline. (5)
    b) Write any five electrophilic substitution reactions of quinoline. (5)
28. Discuss any five synthetic applications of THF.

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