LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **CHEMISTRY**

SECOND SEMESTER – APRIL 2010

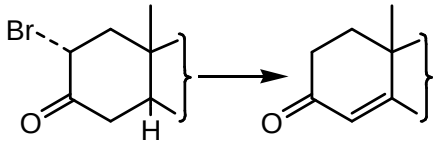
CH 2953 / 2951 - CHEMISTRY OF HETEROCYCLICS AND NATURAL PRODUCTS

Date & Time: 23/04/2010 / 1:00 - 4:00 Dept. No. Max. : 100 Marks

PART A

Answer all the questions **10 × 2 = 20**

1. Write the decreasing order of aromaticity of pyrrole, furan, and thiophene and give reason.
2. State whether pyridine undergoes electrophilic or nucleophilic substitution reaction faster. Give reason.
3. Write the biological importance of heterocyclic compounds with suitable examples.
4. How is thiazole synthesized by ring closure reactions?
5. Give the reactions of conine with HI.
6. How do you establish the functional nature of $-NHCH_3$ group?
7. 0.187 g of alkaloid of empirical formula $C_8H_{13}O_4N$ on heating at 120° C with HI and on reaction with alcoholic $AgNO_3$ yields 0.7314 g of AgI. Calculate the number of methoxy group present in the alkaloid.
8. Explain Hofmann exhaustive methylation method using an example.
9. How the position of double bond in abietic acid is confirmed?
10. Give the mechanism for the following conversion.



PART B

Answer any eight questions **8 × 5 = 40**

11. Discuss the orientation of electrophilic substitution in isoquinoline.
12. Write short note on the following
    a) coumarins b) xanthiones
13. Discuss the general methods for the determination of structures of terpenoids.
14. How the structure of tropinic acid is confirmed by Mackenzie & Wood synthesis?
15. How will you synthesis 1,6-dimethyl-5-isopropylnaphthalene from carvone?
16. Give the structure of heptapylline. How the position and skeleton of C_5 side chain is confirmed by NMR spectroscopy?
17. How is the structure of egonine elucidated?
18. How would you synthesis Vitamin A_1 from 2-methylcyclohexanone?
19. Give the structure and colour reaction of cyanidin chloride.
20. What is Diel's hydrocarbon? How its constitution is established?
21. Give the Robinson method of synthesizing hirsutidin chloride.
22. Explain the structural relationship between flavonols and anthocyanidins.

PART C

Answer any four questions **4 × 10 = 40**

23. Write the reactions of the following with mechanism.
i) Fischer indole synthesis ii) Skraup synthesis (5 + 5)

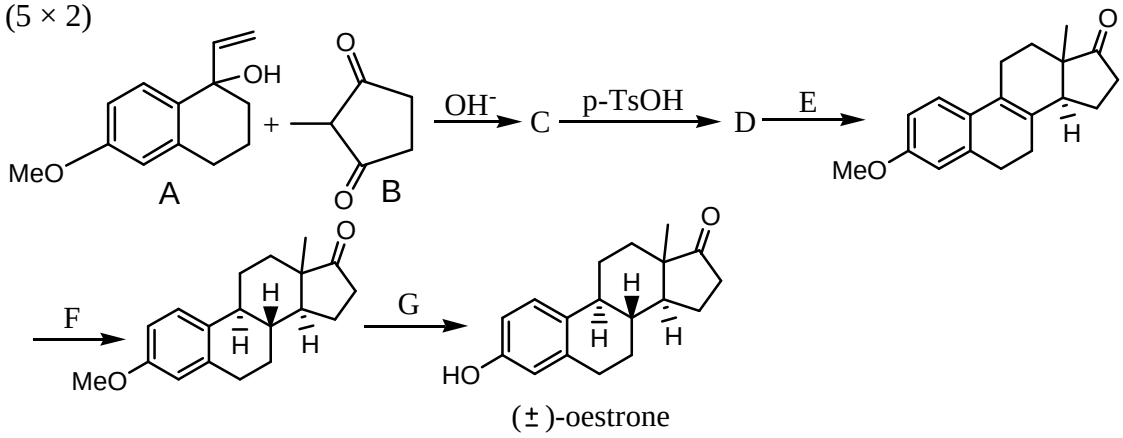
24. Predict the product and explain the reaction for the following
a) quinoline + $NaNH_2 \rightarrow$?
b) Pyridine + $CH_3I \rightarrow$?
c) isoquinoline + $NO_2^+ \rightarrow$? (3 + 3+ 4)

25. a) Give the structure of gibberellic acid. How would you prove the presence of
(i) lactone ring and ii) two types of -OH groups in it? (6)

b) How would you convert α-pinene into camphor? (4)

26. Discuss the structural elucidation of cocaine and confirm the structure by its synthesis. (10)

27. Identify C - G. Indicate the structure of products and reagents represented by C – G. (5 × 2)



(±)-oestrone

28. a) Explain the structural determination of cyanidin chloride?

b) How is the structure confirmed by synthesis? (6 + 4)

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