



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – CHEMISTRY

THIRD SEMESTER – NOVEMBER 2016

CH 3808 - PHOTOCHEMISTRY AND ORGANIC SYNTHESIS

Date: 01-11-2016
Time: 09:00-12:00

Dept. No.

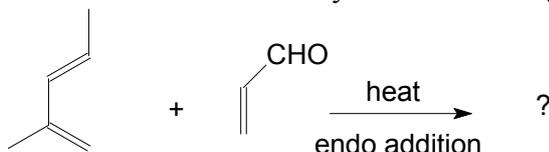
Max. : 100 Marks

Part-A

Answer ALL questions.

(10 × 2 = 20)

1. What is benzoin condensation?
2. Why is the yield of stepwise synthesis lower than convergent synthesis?
3. How synthons are different from synthetic equivalents? Give an example.
4. Predict the product and the stereochemistry of the following reactions.



5. What is the product formed when 1-butene undergoes hydroboration-oxidation?
6. Cite an example for oxy-Cope rearrangement reaction.
7. Draw the FMO picture of the LUMO of 1,3,5-hexatriene.
8. Write the group transfer reaction between ethylene and propene.
9. Discuss the geometry of excited state ethylene molecule.
10. Describe the Norrish type-I reaction in ethylpropyl ketone.

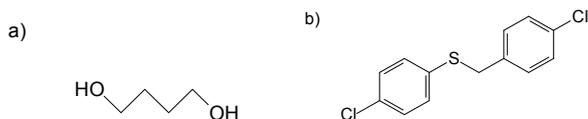
Part-B

Answer any EIGHT questions.

(8 × 5 = 40)

11. Discuss the mechanism of (a) 1,4-Michael addition (b) Darzen's reaction.
12. Explain the synthesis of following compounds.
(a) p-aminophenol (b) ethyl acetoacetate
13. Perform retrosynthetic analysis and suggest a method for the synthesis of the following.

(3 + 2)



14. Describe the mechanism of protection and deprotection of amine and aldehyde functional groups.
15. Explain the mechanism of following reactions.
(a) oxidation of 2-butene by KMnO₄ in basic medium.
(b) Wolff Kishner reduction of acetophenone
16. What are the products formed when a mixture of ethyl acetate and propyl acetate is subjected to electrooxidation?
17. Describe the following reactions with examples. (a) MPV reduction (b) Birch reduction
18. Explain Suzuki coupling reaction of aromatic compounds with a specific example.
19. Write the mechanism of following reactions.
(a) 3,3-sigmatropic benzidine rearrangement.
(b) Electrocyclization of 1,3,5-hexatriene.
20. Draw the correlation diagram for the electrocyclization of 1,3-butadiene by dis-rotation. Predict whether the reaction is feasible thermally or photochemically.
21. What are the products formed when 4,4-diphenylcyclohexa-2,5-dienone undergoes photochemical rearrangement reaction? Write its mechanism.
22. Write the mechanism of photoreduction of benzophenone using
(a) 2-propanol (b) diphenylmethanol.

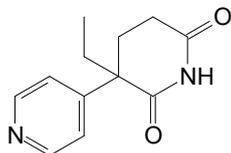
(2½ × 2)

Part-C

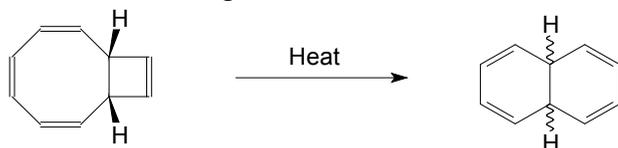
Answer any **FOUR** questions.

(4 × 10 = 40)

- 23 a. What is Wittig Horner reaction? How is it better than Wittig reaction? (4)
b. Using unnatural synthons, prepare any two 1,4-difunctionalised compounds. (3+3)
- 24 a. How are C-C disconnections carried out? Explain with any three guidelines. (5)
b. Perform retrosynthetic analysis of the following compound and suggest a suitable synthetic route. (5)



- 25 a. Explain the mechanism of the following reactions with examples. (3+3)
i) LiAlH_4 reduction of an ester ii) Peracid oxidation of 2-pentanone
b. Explain the synthesis of cubane. (5)
- 26 a. How is an imine reduced using NaBH_4 ? Write the mechanism of reaction. (5)
b. Explain the mechanism of the following reaction and predict the stereochemistry of the mentioned H atoms in the product. (5)



- 27 a. Discuss the mechanism of 1,3-dipolar cycloaddition reactions. (5)
b. Explain 1,5-sigmatropic rearrangement reactions with suitable examples. (5)
- 28 a. Explain di- π -methane rearrangement reaction involving both aliphatic and aromatic substituents. (5)
b. Describe the photochemistry of α,β -unsaturated compounds. (5)
