LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – APRIL 2017

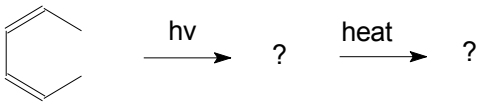
CH 3808- PHOTOCHEMISTRY AND ORGANIC SYNTHESIS

Date: 28-04-2017 Dept. No. Max. : 100 Marks
Time: 09:00-12:00

Part-A

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

1. What is Darzen's reaction?
2. How is carbene synthesized?
3. Why does stepwise synthesis produce yield lower than convergent synthesis?
4. What is Umpolung concept of Seebach?
5. What is the product formed when benzoic acid undergoes Birch reduction?
6. How does 2-butene undergo ozonolysis?
7. How is cycloaddition reaction regioselective?
8. Predict the stereochemistry of the products.



9. What is the geometry of excited state ethylene molecule? Give reasons.
10. What is Norrish type -I reaction? Give an example.

Part-B

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

11. Explain 1,2- and 1,4-Micheal addition reaction in conjugated dienes.
12. Discuss the hydroxylation reaction of alkenes by hydroboration-oxidation.
13. How are the following difunctionalized compounds synthesized?
    a) ethanolamine b) 1,2-dichloroethane
14. What is stereoselectivity? How are stereoselective compounds synthesized?
15. Explain the mechanism of following reactions.
    a) CrO_3 oxidation of benzyl alcohol in $CHCl_3$.
    b) Clemmensen reduction of acetophenone
16. What are the products formed when acetate and propionate undergo electrooxidation reaction?
17. Draw correlation diagram for the electrocyclization of 1,3-butadiene by dis rotation. Predict whether the reaction is thermally or photochemically allowed.
18. Explain the stereochemistry of (1,3)- and (1,5)-sigmatropic rearrangement reactions.
19. What are intramolecular cycloaddition reactions? Explain with an example.
20. Explain the Barton reaction in aliphatic compounds.

21. How does 4,4-diphenylcyclohex-2-en-1-one undergo Zimmerman rearrangement to form various photochemical products?

22. Predict the product in the following reactions.

(i) photocleavage of ethylbutyrate (ii) photoreduction of benzophenone using isopropanol

Part-C

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

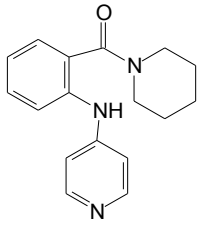
23 a. What is Simon Smith reaction? (2)

b. How are 1,3-dipolar compounds involved in addition reactions? Give suitable examples. (5)

c. FGI results in high yield of the products with no byproducts formed. Justify the statement. (3)

24 a. How are C-C disconnections done? Explain any four guidelines. (6)

b. Perform retrosynthetic analysis and suggest a suitable synthetic route to the following compound.



25 a. How are alcohols protected and deprotected? (4)

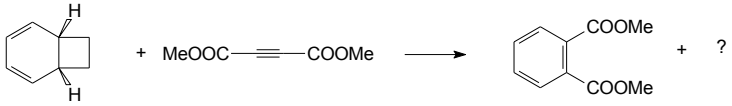
b) Explain the mechanism of the following reactions with examples. (3+3)

i) diborane reduction ii) Sharpless epoxidation

26 a. Describe the synthesis of cubane. (5)

b. Discuss lead tetraacetate oxidation in vicinal halides. (5)

27 a. Predict the product and suggest suitable reaction mechanism. (6)



b) Predict a suitable mechanism for the following thermal reaction. (4)

28 a. Explain photosensitization reactions. How important is the reaction in case of cycloaddition reactions? (6)

b. Explain the di-π-methane rearrangement reaction with an example. (4)

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