

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION - CHEMISTRY

THIRD SEMESTER – NOVEMBER 2013

CH 3808 - PHOTOCHEMISTRY AND ORGANIC SYNTHESIS

Date : 07/11/2013

Dept. No.

Max. : 100 Marks

Time : 9:00 - 12:00

Part-A

Answer all questions. Each question carries two marks.

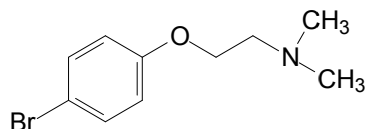
01. Write the mechanism of Benzoin condensation.
02. If 15 g of benzoic acid forms 10 g of benzamide, what is the yield of the product?
03. What are the synthons obtained from the following synthetic equivalents?
(a) $\text{CH}_3\text{CH}=\text{PPh}_3$ and (b) HCHO
04. How is the OsO_4 oxidation of propene carried out?
05. Write the mechanism of heterogeneous catalytic reduction.
06. What are the products formed when carbene undergoes cyclization reaction with butadiene?
07. Draw the Frontier Molecular Orbital diagram of 1,3-butadiene and ethylene for the thermal cycloaddition reaction.
08. Write the mechanism of 3,3'-sigmatropic rearrangement reaction.
09. What is Norrish type I cleavage reaction? Give an example.
10. What is the role of photosensitizers in organic synthesis?

Part-B

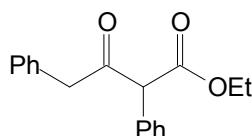
Answer eight questions. Each question carries five marks

11. Explain the mechanism of following reactions: (a) Aldol condensation and (b) Wittig reaction
12. Write the retrosynthesis of the following compounds.

a)

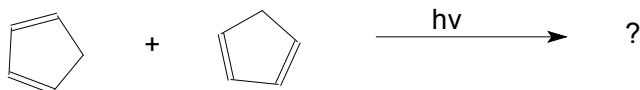


b)



13. Explain the mechanism of LiAlH_4 reduction? What are the functional groups reduced by this reagent? Give an example.

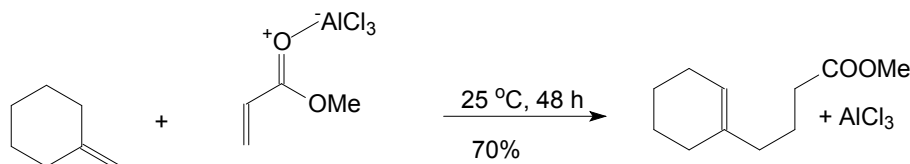
14. How is electro-organic oxidation performed? Explain with any two examples.
15. Write a short note on donor and acceptor synthons. What is Umpolung concept of seebach?
16. Compare in detail the Clemmensen and Wolff Kishner reductions with example.
17. Draw correlation diagram for the electro-cyclization of 1,3-butadiene by con rotation. Predict whether the reaction is thermally or photochemically allowed.
18. Predict the possible products from the following reaction with suitable stereochemistry.



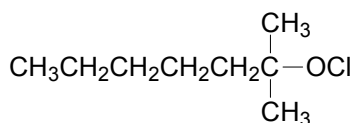
19. Predict a suitable mechanism for the following reactions.



b)



20. Predict the product if the following compound undergoes Barton reaction.



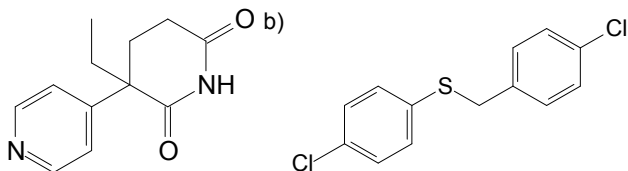
21. Write the photochemical rearrangement of 4,4-diphenylcyclohex-2-en-1-one with complete mechanism.
22. Derive Stern Volmer expression.

Part-C

Answer four questions. Each question carries ten marks

23. (a) Write the mechanism of the following reactions and explain. (5 + 5)
- (i) Knoevenagel reaction
- (ii) Claisen-Schmidt reaction
- (b) What are the advantages of functional group interchange in organic synthesis? Explain with an example? (4)
24. (a) How is an aldehyde protected and then deprotected? (3)
- (b) Explain the mechanism of the following reactions with examples. (4+3)
- (i) dichromate oxidation of alcohol (ii) Perkin reaction
25. a) Describe retrosynthesis for the following compounds. (4 + 2)

a) b)

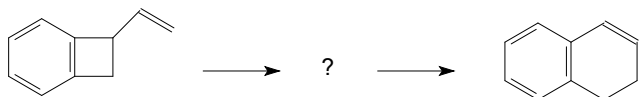


b) How 1,4-difunctionalised compounds synthesized? Give any two examples.

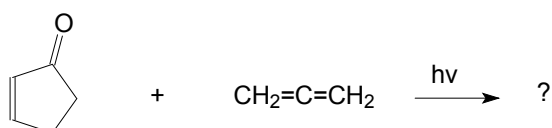
26. (a) Explain the synthesis of cubane. (7)

(b) How catalytic hydrogenation can control stereochemistry in alkynes? (3)

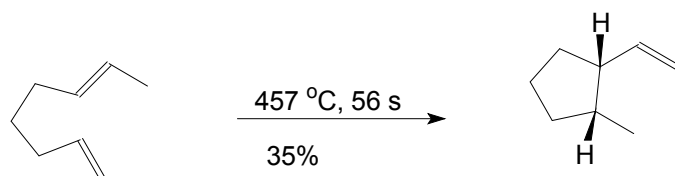
27. (a) Effect the following conversions. Identify the missing product.



(b) Predict the products in the following reaction.



(c) Write the mechanism of following reaction.



28. (a) Explain the photoreduction of benzophenone using 2-propanol.

(b) What are the various photochemical processes taking place in the excited state?

(c) Explain the di- π -methane rearrangement reaction with an example. (3 + 3 + 4)
