



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – CHEMISTRY

FOURTH SEMESTER – APRIL 2024

PCH 4501 – ORGANIC SYNTHESIS AND PHOTOCHEMISTRY

Date: 01-04-2024

Dept. No.

Max. : 100 Marks

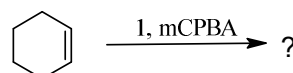
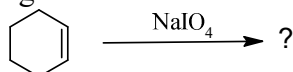
Time: 09:00 AM - 12:00 NOON

Part-A

Answer ALL questions.

(10 × 2 = 20)

1. Compare the nature and reactivity of BuLi and LDA.
2. Draw the structure of 18-crown-6.
3. Identify the products in the given transformations.



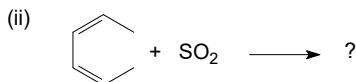
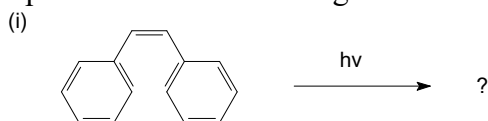
4. Mention any two applications of diazomethane reagent.
5. State Woodward Hoffmann rules for cycloaddition reactions.
6. Draw the FMOs involved in the excited state electrocyclicization of 1,3,5-hexatriene.
7. Cite an example for natural and unnatural synthons.
8. Why is convergent synthesis better than linear synthesis?
9. What are the photophysical processes?
10. Write Norrish Type II reaction with an example.

Part- B

Answer any FOUR questions.

(4 x 10 = 40)

11. Exemplify the application of Dicyclohexyl Carbodiimide (DCC) and Dichlorodicyanoquinone (DDQ).
12. Explain the umpolung reactions with 1,3-dithiane anions.
13. Compare the selective reactive nature of PCC and PDC with chromium trioxide.
14. (a) Cycloaddition reactions are regioselective. Justify with an example. (5)
(b) Predict the products in the following reactions and write their mechanism. (2+3)



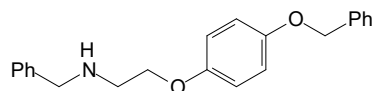
15. (a) Explain the following sigmatropic reactions with examples. (3+3)
(i) Benzidine rearrangement (ii) Claisen rearrangement
(b) Describe the importance of functional group interconversion with an example. (4)
16. Discuss any four guidelines for carbon-carbon bond disconnections with suitable examples.
17. (a) How are 1,2- and 1,3-difunctional compounds synthesized? Explain with suitable examples. (6)
(b) Discuss the electro-oxidation reactions with suitable examples. (4)
18. (a) Explain the photochemistry of α,β -unsaturated ketones. (5)
(b) Predict the products in the following photochemical reactions. (3+2)
(i) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_2\text{CH}_3 + h\nu \longrightarrow ?$
(ii) $\text{C}_6\text{H}_5\text{CH}_2\text{COCH}_3 + h\nu \longrightarrow ?$

Part- C

Answer any TWO questions.

(2 x 20 = 40)

- 19 (a) Analyze the utility of Zeigler-Natta catalyst with mechanism. (10)
(b) What are ylides? Discuss the application of Wittig reaction. (10)
- 20 (a) Demonstrate the application of Suzuki reaction. (10)
(b) Compare the reactivity and applications of LAH, NaBH₄ and NaCNBH₃. (10)
- 21 (a) Draw correlation diagram for the cycloaddition of 1,3-butadiene and ethylene. Predict whether the reaction takes place by thermal or photochemical means. (7)
(b) Describe the mechanism of [1,3]- and [1,5]-sigmatropic rearrangement reactions. (6)
(c) Perform the retrosynthetic analysis of the following compound and subsequently synthesize it. (7)



22. (a) What are protecting groups? How is aldehyde protected and deprotected? (5)
(b) Explain the photoreduction and photorearrangement reactions with suitable examples. (8)
(c) Derive Stern Volmer expression. (7)
