LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

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

FOURTH SEMESTER – **APRIL 2025**

PCH 4501 – ORGANIC SYNTHESIS AND PHOTOCHEMISTRY

Date: 23-04-2025 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A

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

1. Demonstrate the utilities of silane reagents as protecting groups.
2. Describe the application of umpolung concept with examples.
3. Compare the selective reactive nature of PCC and PDC with Chromium trioxide.
4. Discuss any two types of cyclo-addition reactions with suitable examples.
5. Which is a better synthetic route - stepwise synthesis or convergent synthesis? Justify them with an example for each.
6. What are synthons? Discuss the various types of synthons with suitable examples.
7. Explain Norrish Type-I and –II reactions with suitable examples.
8. Draw Jablonski diagram and write equations for all the photophysical processes.

SECTION B

Answer any THREE questions. **(3 x 20 = 60)**

9. (a) Evaluate the mechanism and selectivities of catalytic hydrogenation and hydrides based reduction reactions. (10+10)
   (b) What are ylides? Discuss the application of Wittig reaction.
10. (a) Compare Heck and Suzuki reactions. (10+10)
    (b) Write a note on the following reactions
    (i) Sharpless asymmetric epoxidation.
    (ii) Birch reduction.
11. (a) Explain the usage of Ziegler-Natta polymerization in synthesizing stereoregular polymers. (10+10)
    (b) Write the mechanism of [1,3]- and [1,5]-sigmatropic rearrangement reaction.
12. (a) Draw correlation diagram for the cycloaddition reaction of 1,3-butadiene with ethylene. Predict whether it happens by thermal or photochemical conditions? (10+10)
    (b) What are group transfer reactions? Discuss the thermal and photochemical group transfer reactions.
13. (a) What is functional group inter-conversion? Discuss its significance with any two examples. (10+10)
    (b) How are the functional groups, alcohol and aldehyde, protected and deprotected?
14. (a) What is Paterno Buchi reaction? How does it take place in alkynes? (10+10)
    (b) Discuss any one photo-rearrangement reaction with suitable example.
