

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN  
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)  
Chromepet, Chennai - 600 044.

M.Sc.Chemistry - END SEMESTER EXAMINATIONS - APRIL 2025

SEMESTER - III

**22PCHCT3007 - Retrosynthetic Analysis and Pericyclic Reactions**

Total Duration : 2 Hrs. 30 Mins.

Total Marks : 60

**Section B**

Answer any **SIX** questions ( $6 \times 5 = 30$  Marks)

1. How do synthetic equivalents differ from synthons in retrosynthetic analysis?
2. Discuss with example chemoselectivity in the disconnection of alcohols and carbonyl compounds.
3. Explain the Diels-Alder reaction in the context of retrosynthesis.  
How does it help in the construction of cyclic structures ?
4. Define umpolung in organic synthesis. Explain the role of acyl anion equivalents with an example.
5. Compare the reactivity and synthetic applications of organolithium and organomagnesium reagents in carbon-carbon bond formation.
6. Discuss the Diels-Alder reaction as a type of cycloaddition reaction.
7. Explain the Frank-Condon principle and its significance in photochemical processes.
8. Examine the Di- $\pi$ -methane rearrangement with a suitable mechanism and examples.

**Section C**

I - Answer any **TWO** questions ( $2 \times 10 = 20$  Marks)

9. Outline a retrosynthetic approach for the synthesis of  $\alpha, \beta$ -unsaturated carbonyl compounds.
10. Explain the protection and deprotection strategies for hydroxyl, carbonyl, and amino groups, along with their significance in multi-step synthesis.
11. Explain the mechanisms and synthetic applications of Heck, and Sonogashira reactions with suitable examples.

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12. Compare and contrast Claisen, Cope, and Aza-Cope rearrangements. Explain their mechanisms and provide suitable examples illustrating their synthetic applications.

II - Compulsory question (1 × 10 = 10 Marks)

13. Explain the photochemistry of cyclohexadienones and Santonin. Discuss the mechanistic pathways involved and their significance in organic synthesis.

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