

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2023  
(Regular/Improvement/Supplementary)

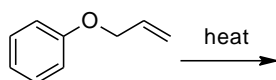
CHEMISTRY  
FCHE3C11 - PHOTOCHEMISTRY AND PERICYCLIC REACTIONS

Time: 3 Hours

Maximum Weightage: 30

Section A: Short answer questions. Answer any *eight* questions. Each carries *one* weightage.

1. Give the mechanism of photo-enolisation. Explain why aromatic carbonyl compounds with an alkyl group at *ortho* position undergo rapid and reversible photo-enolisation reaction.
2. Predict whether a [4+2] cycloaddition could be photo-induced if the dienophile, instead of the diene, were the excited reactant. Substantiate your answer.
3. Predict the product for the following reaction:



4. Discuss different types of quenching process.
5. Give two examples in which structure elucidation has utilized degradative reactions.
6. Illustrate any two synthetic strategies leading to thietanes.
7. It is identifiable from the structure of the substrate, whether it will undergo lumi ketone rearrangement or di- $\pi$  methane rearrangement. Substantiate your answer with an example.
8. Explain with the help of an example how amino acid sequencing can be done.
9. Identify the functions of c-AMP.
10. Depict a synthesis of a heterocycle having four heteroatoms.
11. Discuss what strategy is used to restrict Wittig Reaction to one carbonyl group in the Wieland Miesher ketone used in the synthesis of Longifoline.
12. What are the criteria required for a compound to act as sensitiser?

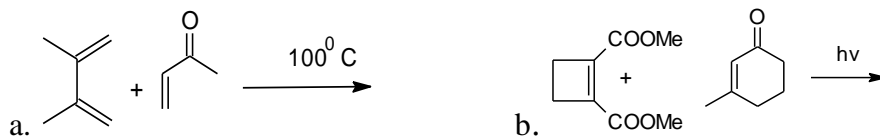
(8 × 1 = 8 weightage)

Section B: Short essay questions. Answer any *four* questions. Each carries *three* weightage.

13. Briefly discuss the principle of solar cells.
14. Give a note on Norrish type reactions of cyclic and acyclic ketones.
15. Discuss ene reaction and show how it is related to [1,5] sigmatropic shift and Diels-Alder reaction.

(P.T.O.)

16. Predict the product with proper mechanism.



17. Derive Stern-Volmer Equation. Is it possible to obtain true quenching rate constant from this equation? Justify your answer.

18. Describe the  $\alpha$ -helix and  $\beta$ -sheet structure of proteins.

19. Portray two syntheses each of: a) azetidine b) reduced pyrrole c) thiazole.

(4 x 3 = 12 weightage)

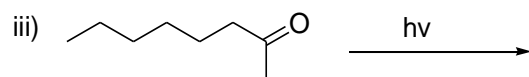
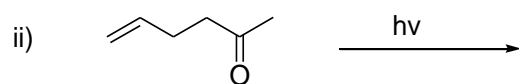
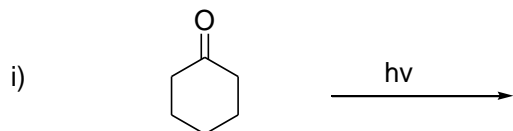
**Section C: Essay questions. Answer any two questions. Each carries five weightage.**

20. Explain the electrocyclic reaction of 1,3,5-hexatriene using correlation, FMO and transition state aromaticity method.

21. a) Systematically elucidate the structure of quinine.

b) Schematically represent a total synthesis of reserpine.

22. a) Suggest the structure of the products and a mechanistic pathway for each of the following photochemical reactions.



b) Briefly discuss on the photolysis of organic nitrites.

23. Discuss:

a) Quarternary structure of proteins.

b) Protein biosynthesis.

(2 x 5 = 10 weightage)