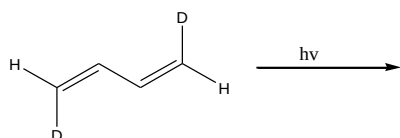


**THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2024**  
**(Regular/Improvement/Supplementary)**

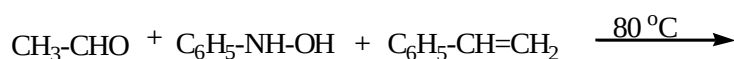
**CHEMISTRY**  
**FCHE3C11 - PHOTOCHEMISTRY AND PERICYCLIC REACTIONS**

**Time: 3 Hours****Maximum Weightage: 30****Section A: Short answer questions. Answer any *eight* questions. Each carries *one* weightage.**

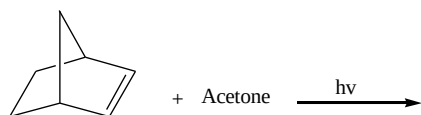
1. Predict the product of the following reaction with suitable explanation.



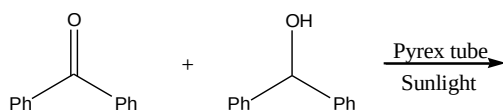
2. Give the product in the following reaction with its steps of formation.



3. Differentiate chemiluminescence from photoluminescence.  
4. Discuss briefly the working principle of solar cells.  
5. Complete the following reaction.



6. Complete the following reaction with its mechanistic pathway.

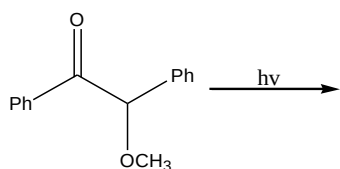


7. Giving an example, explain Hofmann exhaustive methylation method of structural elucidation in alkaloid chemistry.  
8. Discuss the classification of terpenoids briefly.  
9. Discuss two different synthetic route of tetrazoles.  
10. Explain why pyrroles undergo electrophilic substitution reaction preferably at 2- position.  
11. Differentiate different types of ribo nucleic acids.  
12. Briefly discuss the structure of ADP.

**(8 × 1 = 8 weightage)**  
**(P.T.O.)**

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

13. (a) Illustrate the symmetry condition for cyclisation reaction of 1,3-butadiene under thermal and photochemical conditions.
- (b) Explain Claisen sigmatropic rearrangement with its mechanism.
14. (a) Discuss the *endo* and *exo* stereochemistry and formation of bicyclic compounds using Diels-Alder reaction.
- (b) What do you mean by the term photosensitizer and explain which type of compounds can behave as a photosensitizer.
15. (a) Write the different products formed in the following photochemical transformations.



- (b) Write a note on photodimerisation of  $\alpha,\beta$ -unsaturated ketones.
16. Discuss the specific steps involved in the structural elucidation of atropine.
17. Discuss at least two synthetic strategies for each of following heterocycles.
- (i) Aziridine; (ii) Thiazole; (iii) Furan.
18. Discuss the DNA replication, structure and physiological functions of ATP in detail.
19. Discuss:
- (a) Hofmann-Löffler-Freytag reaction with mechanism and its importance.
- (b) Phenomenon of quenching of fluorescence.

**(4 × 3 = 12 weightage)**

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

20. (a) Explain Norrish type-1 and Norrish type-II photochemical reactions with its mechanism. Explain the importance of the two reactions.
- (b) Explain the mechanism of di- $\pi$  methane rearrangement. What would be the stereospecific product obtained when 2,4,4-trimethyl-6,6-diphenyl-2,5-hexadiene undergoes this rearrangement.

21. (a) Draw the Jablonski Diagram and discuss various photophysical processes.
- (b) Construct correlation diagram for *dis*-rotatory and *con*-rotatory cyclisations of hexatriene to cyclohexadiene. Using the correlation diagram, explain which mode of cyclization is allowed under photochemical conditions for the given compound.
22. (a) Explain the total synthesis of reserpine with the detailed chemistry and stereochemical features.
- (b) Discuss the general method of isolation of terpenoids.
23. (a) Explain the primary, secondary, tertiary and quaternary structure of proteins in detail.
- (b) Discuss any two methods for the synthesis of pyrazole.

**(2 × 5 = 10 weightage)**