No. of Printed Pages : 03 **Roll No. .....**

DD297

M. Sc. EXAMINATION, 2021

(Fourth Semester)

(B Scheme) (Re-appear)

(CHEMISTRY)

CH614B

PHOTOCHEMISTRY AND PERICYCLIC REACTIONS ORGANIC CHEMISTRY

Time : 2½ *Hours*] [*Maximum Marks :* 100

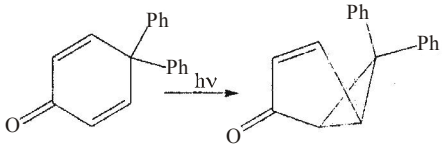
Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

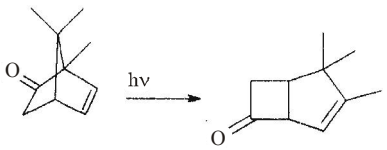
Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) Explain Jablonski diagram and explain all terms used in this diagram.

(b) Discuss photochemical Cis–Trans isomerisation of alkenes.

2. (a) Suggest mechanism for the following reactions :

(i) 

(ii) 

(b) Explain the following terms :

(i) Phosphorescence

(ii) Fluorescence

(iii) Actinometery.

(c) Discuss the photochemistry of cyclohexa dienones.

3. (a) Explain the generation, detection and stability of free radicals.

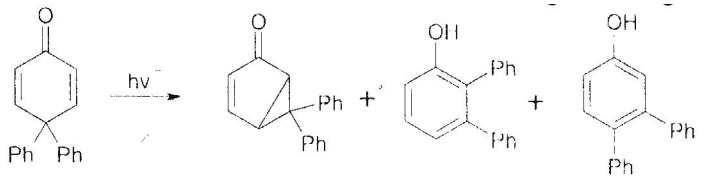
(b) Give the mechanism of Barton reaction and discuss their synthetic applications.

4. (a) Discuss in brief the following reactions :

(i) Paterno-Buchi-reaction

(ii) Photos-fries reaction.

(b) Give a suitable mechanism for the following rearrangement :



(c) What happens when 1, 3-butadiene reacts with singlet oxygen molecule ?

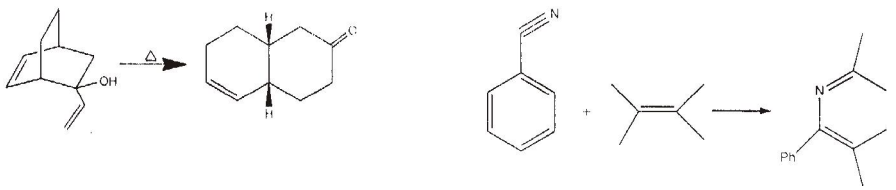
5. (a) With the help of correlation diagram and PMO approach prove that $\pi^2_s + \pi^2_s$ cycloaddition reaction are photochemically allowed.

(b) Explain mechanism of Claisen rearrangement and give its synthetic importance.

(c) Construct correlation diagrams for conrotatory and disrotatory process from interconversion of cyclohexadiene $\rightleftharpoons$ hexatriene system.

6. (a) Discuss [1, 3] sigmatropic rearrangement with mechanism.

(b) Explain the mechanism of the following reactions :



(c) [1, 3] sigmatropic migration of hydrogen cannot occur under thermal conditions, but [1, 3] sigmatropic migration of carbon can occur under thermal condition. Explain.

(d) Electrocyclic ring opening reaction of 1, 3-cyclohexadiene in conrotatory mode is thermally forbidden.

7. (a) Write explanatory notes on the following :

(i) Anomeric and double anomeric effect.

(ii) 1, 3-diaxial interaction

(iii) Transannular reaction.

(b) Discuss the conformational analysis of cyclodecane.

8. (a) Discuss the effect of conformation on chemical reactivity by taking examples of cyclohexane derivatives.

(b) Discuss conformational analysis of cyclohexanone.