(b) Explain the following terms : **14**

(i) Photo-fries reaction of anilides

(ii) Singlet molecular oxygen reaction

(iii) Dimerization reaction of carbonyl compound

(iv) Photodegradation of polymer.

4. (a) Discuss the Paterno-Buchi reaction with mechanism and its stereochemical consequences. **8**

(b) Give mechanism and synthetic applications of Barton reaction. **8**

(c) Write the products of bromination of 1-butene with NBS and indicate the major product. **4**

Unit III

5. (a) Under photochemical conditions, will ring closure of (2E, 4Z, 6Z, 8E)-decatetraene be conrotatory or disrotatory ? Will the product have the cis or the trans configuration ? **6**

No. of Printed Pages : 07 Roll No. .....

DD-297

M. Sc. EXAMINATION, May 2017

(Fourth Semester)

(Main & Re-appear)

CH-614-B

CHEMISTRY

Organic Chemistry Special-IV

(Photochemistry and Pericyclic Reactions)

Time : 3 *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 *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Write brief notes on the following : **10**

(a) Explain electronic excitation and their selection rules. Discuss fate of excited molecule (Jablonskii diagram) and term involved.

(b) Discuss the photochemical rearrangement of 1, 4 and 1, 5-dienes with examples. **10**

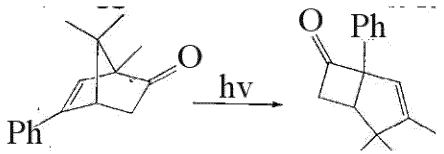
2. (a) Explain the following terms : **9**

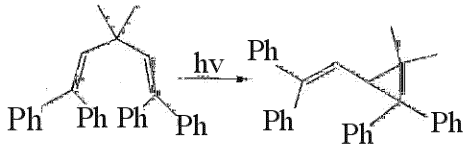
(i) Quantum yield and Actinometry

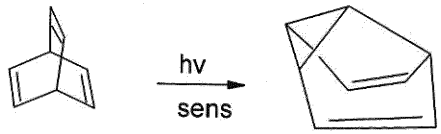
(ii) Importance of photosensitiser in photochemistry

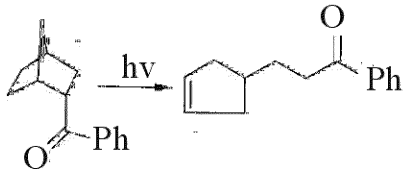
(iii) Norrish Type-II process with example

(b) Suggest mechanism for the following reactions : **8**

(i) 

(ii) 

(iii) 

(iv) 

(c) Explain, the photochemical isomerisation (geometrical) of alkenes. **3**

Unit II

3. (a) Irradiation of o-xylene gives a miture of m- and p-xylen, proposed a mechanism for this transformation. **6**

(b) Explain, why maleic anhydride reacts rapidly with 1, 3-butadiene but does not react at all with ethene under thermal conditions. **4**

(c) With the help of correlation diagram and PMO approach prove that Diels-Alder reaction is thermally allowed. **6**

(d) Discuss [1, 3] sigmatropic rearrangement with mechanism. **4**

6. (a) 5-methyl-1, 3-cyclopentadience rearranges to give a mixture of 5-methyl-1, 3-cyclopentadiene, 1-methyl-1, 3-cyclopentadiene, and 2-methyl-1, 3-cyclopentadiene. Show how these products are formed. **4**

(b) Write explanatory notes on the following : **6**

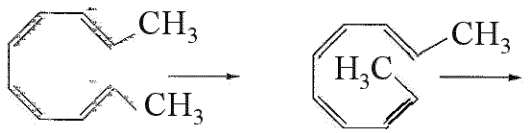
(i) Claisen rearrangement

(ii) [1, 5] sigmatropic rearrangement.

(c) Give the product formed when each of the following compounds undergoes an electrocyclic reaction : **6**

(i) Under thermal conditions

(ii) Under photochemical conditions.



I II

(d) With the help of FMO methods show that the [2+2] cycloaddition reaction between alkene and ketene is thermal allowed reaction. **4**

Unit IV

7. Write short notes on the following : **20**

(a) Annomeric effect and double Annomeric effect

(b) Ring inversion and pyramidal inversion

(c) Conformational analysis of medium ring compounds

(d) 2-alkyle ketone and 3-alkyl ketone effects in cyclohexanone.

8. (a) With suitable examples discuss the stereochemistry of nitrogen containing compounds, strain and their consequences in small ring heterocycles. **9**

(b) Write an explanatory note on conformation of cyclodecane. **8**

(c) Explain, trans annular reactions with minimum two examples. **3**