*Total number of printed pages–7*

**4 SEM PG CHM (CBCS) IC–IV 403**

**2026**

(June)

**CHEMISTRY**

Paper : Core – 403

***(Organic Chemistry–IV)***

*Full Marks : 60*

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

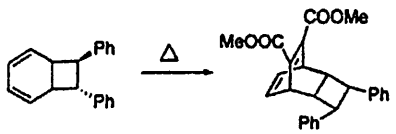
Answer of **UNIT–I** and **UNIT–IV** in one book and **UNIT–II** and **UNIT–III** in a separate book

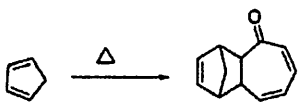
**UNIT–I**

*(Marks : 20)*

1. Answer ***any six*** of the following : 3×6=18

   *(a)* Suggest the suitable dienophiles for the following reactions :



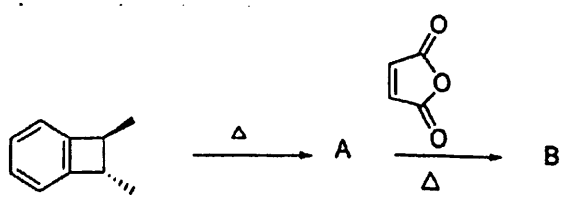



(b) On heating 1,3,5-cyclooctatriene gives a bicyclic product which on photochemical ring opening gives a triene compound. Write down the reaction schemes with proper stereochemistry of the products.

(c) Write the stereostructure of the compound obtained by the Diels-Alder reaction of dimethyl maleate with butadiene. Using FMO approach show that the Diels-Alder reactions are thermally allowed. 1+2=3

(d) With the help of FMO approach show that [1,5]-H shift by suprafacial mode is thermally allowed whereas photochemical 1,5-shift is an antarafacial process.

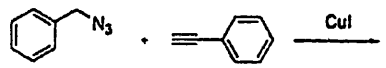
(e) Write down the products (A and B) with proper stereochemistry on the following reaction sequence :

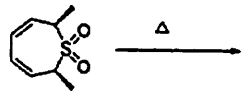


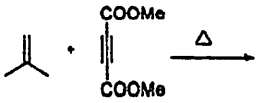

(f) Write down the major product that is formed when 3R,4S-3,4-dimethyl hexa-1,5-diene is heated at 240°C ?



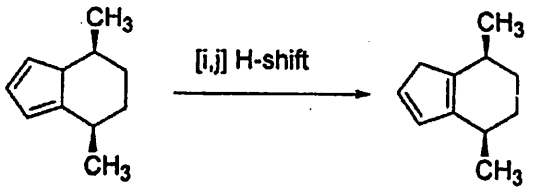
(g) Predict the product of the following :

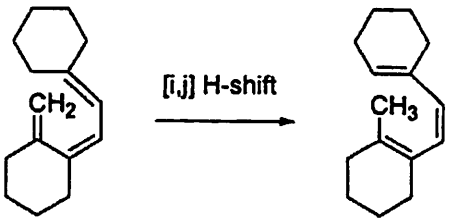
(i) 


(ii) 


(iii) 


(h) Assign i,j in the following [i,j] H-shift :

(i) 


(ii) 

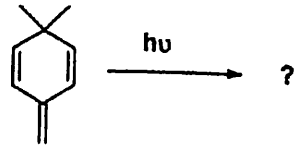

2. Giving an example, mention the important features of a click reaction. 2

## UNIT-II

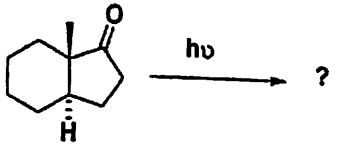
*(Marks : 20)*

3. Complete ***any five*** of the following reactions : 2×5=10

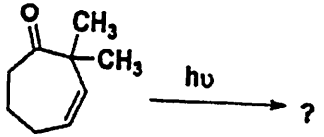
*(i)*



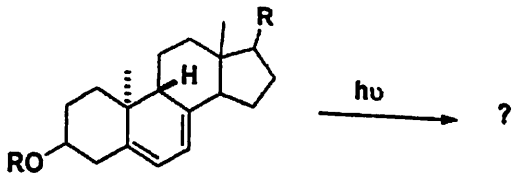

*(ii)*



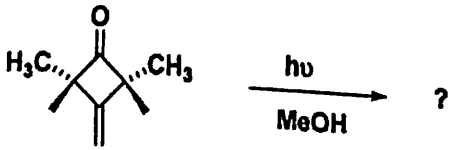

*(iii)*




*(iv)*

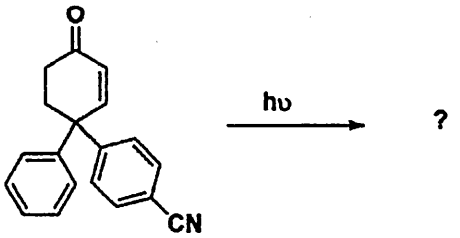



*(v)*






*(vi)*




4. Answer the following questions : 2×5=10

*(a)* Describe the Norrish Type II with example.

*(b)* Explain the role of light in vision.

*(c)* What is Paterno-Büchi reaction? Discuss its mechanism along with the stereochemical consequences.

*(d)* Explain the mechanism of singlet oxygen formation via photosensitization.

*(e)* Discuss the cis-trans isomerism in stillbene.

## UNIT–III

*(Marks : 10)*

5. Answer ***any five*** of the following questions : 2×5=10

*(i)* Explain the detailed mechanism for the pyrrole synthesis from Barton-Zard method.

*(ii)* What is meant by inversion of configuration in Mitsunobu reaction ? Explain with a suitable example.

*(iii)* Describe the role of nucleophilic catalysts such as DABCO in Baylis-Hilman reaction.

*(iv)* What is Barton reaction ? Explain with a suitable example.

*(v)* Give an example of allylic bromination reaction using NBS.

*(vi)* Explain the detailed mechanism of Vilsmeier-Haack reaction.



## UNIT–IV

*(Marks : 10)*

6. Answer ***any two*** of the following questions : 4×2=8

*(a)* Giving an example, mention two advantages and disadvantages of PASE synthesis.

*(b)* How does microwave radiation accelerate organic reactions ? Giving one example state why microwave is considered a green technique.

*(c)* *(i)* Write the advantages of using nanoparticles as catalyst for organic synthesis. 2

*(ii)* How does morphology of nanoparticles affect the catalytic activity and selectivity in organic reactions ? 2

7. Mention the differences between parallel synthesis and combinatorial synthesis. 2

**Or**

Mention *two* catalysts that are used in olefin metathesis.

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