Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

Master's Degree Examination – June / July 2021
II Semester

Class : I PG **Time : 3 Hours**
Major : Chemistry **Max. Marks: 100**

20MCHC07 Organic Chemistry III

PART A **10 x 1 = 10**

Choose the Correct Answer

1. In butadiene which is HOMO in thermal condition K3
   a. Ψ1 b. Ψ3 c.Ψ2 d. Ψ4
2. In 1,3,5 hexatriene, which is LUMO in photochemical condition K3
   a. Φ3 b. Φ4 c.Φ5 d. Φ6
3. Predict the product of the following reaction is K5
4. The concerted photochemical reaction between two olefins leading to a cyclobutane ring is K3
   a. $\pi^2s + \pi^2a$ b. $\pi^2s + \pi^2s$ c. $\sigma^2s + \sigma^2s$ d. $\pi^2s + \sigma^2a$
5. Life time of fluorescence emission is _____ K1
   a. 10^{-3}-10^{1}s b. 10^{-10}-10^{-7}s c. 10^{-11}-10^{-9}s d. 10^{-12}-10^{-10}s
6. The first excited state molecule moved to first excited triplet is called K2
   a. Internal conversion b. Vibrational cascade
   c. Intersystem crossing d. Vibrational relaxation
7. Predict the product of this reaction? K5
8. Predict the product of the following reaction K5

   a. acetophenone b. Benzpinacol c. pinacolone d. benzyl alcohol
9. Choose the Dewar benzene K3
10. Select the structure of Fulvene from among the following structure K2

Part B **5 x 6 = 30**

Answer ALL questions
Each answer should not exceed 400 words or two pages

11.a. State whether CON rotatory or DIS rotatory motion of the groups is involved in the following reactions. Identify whether it is a thermal or photochemical condition. K4

(or)

11.b. Indicate, how frontier molecular orbital theory can help to analyse electrocyclic reaction? K2

12.a. Explain the mechanism, scope and application of Cope and Claisen rearrangements. K3

(or)

12.b Predict the products with correct stereochemistry K5

13.a. Discuss the laws of photochemistry K2

(or)

13.b Explain about the quantum yield of photochemical reaction K3

14.a Explain Paterno-Buchi reactions with examples K3

(or)

14.b Discuss about the Photo chemistry of α,β unsaturated ketones K2

15.a. Explain photo Fries rearrangement with examples. K3

(or)

15.b. Discuss the diene-photochemistry of the 1,3 butadiene. K2

Part C **5 x 12 = 60**

Answer ALL questions

Each answer should not exceed 800 words or four pages

16.a. Draw the orbital correlation diagram for CON rotatory ring closure of 1,3,5hexatriene and show that the reaction is thermally forbidden. K4

(or)

16.b i. Draw the orbital correlation diagram for CON rotatory ring closure of 1,3 butadiene. (7) K3

ii.

17.a. Explain why, i. maleic anhydride is a powerful dienophile in Diels Alder reaction K4
ii. Endo adduct is preferred over to Exo adduct during Diels Alder reaction
iii. π2s + π2a addition is feasible with vinyl cation
iv. [3,3]- sigmatropic rearrangement is not very popular under photochemical condition (3+3+3+3)

(or)

17.b. Predict the products for the following reactions K5

18.a. Explain in detail all the process involved in Jablonski diagram K3

(or)

18.b. i. Explain the experimental methods of photochemistry (8) K3
ii. Discuss photosensitization with example (4)

19.a. i. Describe the photo dienone-phenol rearrangement in detail (8) K2
ii. Predict the product and explain (4) K5

(or)

19.b. Explain with mechanism of the Norrish type I and II reaction with suitable examples K4

20.a. Discuss about the olefin cis-trans isomerization and dimerization with examples K2

(or)

20.b. i. Illustrate the photochemistry of benzene in various forms (8) K3
ii. explain Barton reaction with example (4).

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