

M.Sc.(Chem.) Semester - 3 (CBCS) Examination

Oct/Nov-2021 (NEW COURSE)

Advanced Organic Chemistry (Core (New))

Time: 2:30 Hours

Marks: 70

Instructions:

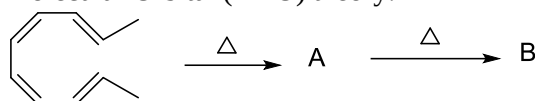
1. All questions are compulsory.
2. Figures to the right indicate marks.

Q.1(A) Answer the following (4)

- (1) Give classification of Pericyclic reaction. 2
- (2) Discuss HOMO, LUMO and symmetry criteria for 1,3,5-hexatriene system under thermal and photochemical reaction condition. 2

Q.1(B) Answer any two question out of three. (10)

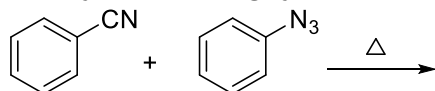
- (1) Predict the products (A & B) of the following reaction and discuss mechanism using Frontier Molecular Orbital (FMO) theory: 5



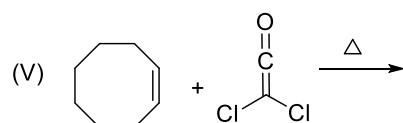
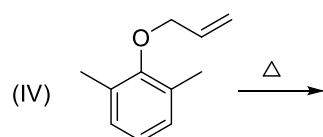
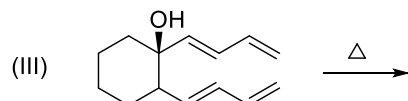
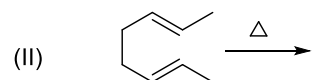
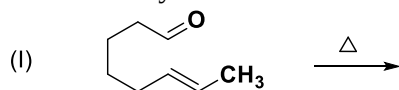
- (2) Discuss Mobius-Huckel Analysis for electrocyclic ring opening and closing with one example of each. 5
- (3) Apply Woodward-Hoffmann correlation diagram and deduce reaction condition (thermal/photochemical) for electrocyclization of following system: (a) 2E,4Z,6E-Octatriene 5

Q.2(A) Answer the following (4)

- (1) What is chelotropic reaction? Explain with one example. 2
- (2) Identify the following cycloaddition reaction and discuss the regioselectivity: 2

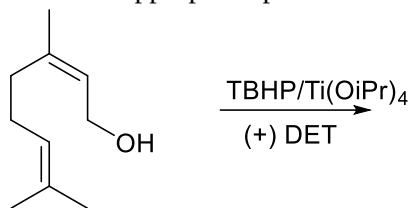
**Q.2(B) Answer any two question out of three. (10)**

- (1) Explain Retro Diels-Alder reaction with mechanism using suitable examples. 5
- (2) Why cycloaddition reaction of cyclopentadiene with maleic anhydride is endo-selective? Explain with mechanism. 5
- (3) Identify the following reactions (I to V), and write their corresponding product. Justify your answer briefly. 5



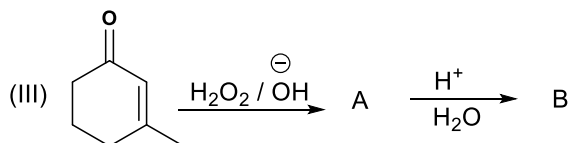
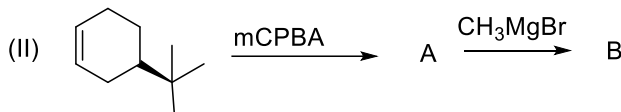
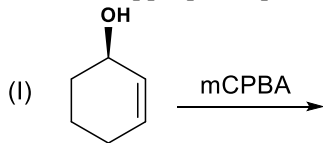
Q.3(A) Answer the following (4)

- (1) How will you prepare epoxide on Michael acceptor? Give one example. 2
- (2) Write the appropriate product of following reaction and justify your answer 2



Q.3(B) Answer any two question out of three. (10)

- (1) What is chiral auxiliary? Describe application of Evans oxazolidinones auxiliary in the asymmetric synthesis with one example. 5
- (2) Write the appropriate product of following reactions sequence (I & II) with mechanism: 5



- (3) Give structure of Corey-Bakshi-Shibata (CBS) reagent and describe its one application in enantioselective synthesis with mechanism. 5

Q.4(A) Answer the following (4)

- (1) Give definition of True alkaloids and Protoalkaloids. 2
- (2) How will you synthesize Tropic acid? 2

Q.4(B) Answer any two question out of three. (10)

Describe the total synthesis of any one alkaloid from following group:

- (1) Phenanthrene 5
- (2) Indole 5
- (3) Pyridine 5

Q.5(A) Answer the following (4)

- (1) Which sugars are present in DNA and RNA? Give their structure. 2
- (2) Write one example of (a) Nucleoside (b) Nucleotide 2

Q.5(B) Answer any two question out of three. (10)

Describe the total synthesis of following natural product:

- (1) 2'-deoxyadenosine. 5
- (2) 2,6-dihydroxypurine 5
- (3) 5-methyluracil 5
