MANAV RACHNA UNIVERSITY
DEPARTMENT OF CHEMISTRY
"T3, Examination, May 2017-18"

Semester: II	**Date of Exam: 17/05/2018**
Subject: Organic Chemistry-II	**Subject Code: CHH509-T**
Branch: Chemistry	**Session: 9:00 to 12:00 Noon**
Course Type: Hard Core	**Course Nature: Hard**
Time: 3 Hours	**Program: MSc**
Max.Marks: 100	**Signature: HOD/Associate HOD:**

Note*: Part A: Each question is of 10 marks, attempt any two of three.*

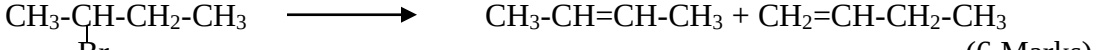
Part B & C. Each question will be of 20 marks and attempt two each from Part B & C.

Part A (Attempt any Two)

1. (a) Write the mechanism for the addition of HBr to an alkene in the presence of H_2O_2. Explain, why only HBr and not HCl show similar kind of mechanism under similar conditions (6 Marks)
   (b) Explain Michael Addition Reaction by giving its mechanism. (4 Marks)
2. (a) Give the structure of alkene you would start with, and the reagents as well as special conditions necessary to convert it into each of these products:
   (i) Iso butyl bromide
   (ii) 1-chloro-2-methyl-2-butanol (4 Marks)
   (b) Discuss the evidences for formation of tetrahedral intermediates during the ester hydrolysis by $A_{AC}2$ and $B_{AC}2$ mechanisms respectively. (6 Marks)
3. (a) Write down the mechanism for Ozonolysis of an alkene (A), which yields the following products on reaction, $C(CH_3)_3CHO$ & $(CH_3)_2CO$. Identify the alkene (A) in the reaction and write its IUPAC name. (5 Marks)
   (b) Ester hydrolysis by $B_{AL}2$ mechanism is rare. Explain. (3 Marks)
   (c) What are the two factors that majorly affect the hydrolysis of esters? Explain by giving suitable example. (2 Marks)

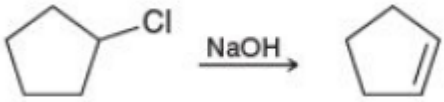
Part B (Attempt any Two)

4. (a) 2-bromobutane reacts with sodium hydroxide solution under suitable conditions to give a mixture of but-1-ene and but-2-ene. Write the mechanism for the formation of but-1-ene and but-2-ene. Which butene is going to be the major product and why?



(6 Marks)

   (b) Give evidences to prove that E2 elimination reactions are predominantly anti eliminations & there is relation between conformation & reactivity. (4 Marks)
   (C) Write a note on E1cB elimination reactions (4 Marks)
   (d) E2 reactions exhibit second order kinetics. Consider the reaction below and answer the questions:



What happens to the rate if the concentration of:

(i) Chlorocyclopentane is tripled and sodium hydroxide remains the same?

(ii) Chlorocyclopentane remains the same and sodium hydroxide is doubled?

(iii) Chlorocyclopentane is doubled and the concentration of sodium hydroxide tripled? (6 Marks)

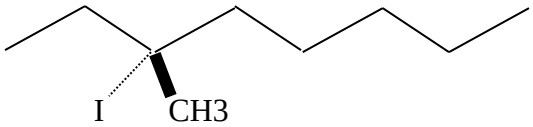
5. (a) What are Pyrolitic elimination reactions? How such reactions proceed with acetates & Xanthates. (6 Marks)

   (b) Write a note on Cope Elimination reaction. (4 Marks)

   (c) What major product results when 2-bromo-2-methylbutane is treated with sodium ethoxide. Explain the rule on basis of which this product is formed. (5 Marks)

   (d) Write the mechanism for E1 elimination reactions. Predict the products of reaction between tert. butyl bromide & ethanol. (5 Marks)

6. (a) How many distinct alkenes can result from E2 elimination of the compound below? Give their structures and IUPAC names.



(5 Marks)

(b) Write the mechanism of Chugave reaction. (5 Marks)

(c) Both substitution and elimination will happen during the reaction between a mixture of 2-bromopropane and sodium hydroxide solution. State the conditions which will give you the greatest chance of getting elimination rather than substitution. (6 Marks)

(d) Predict which of the following will undergo E1/SN1 more rapidly. Why?

(4 Marks)

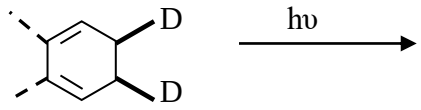
Part C (Attempt any Two)

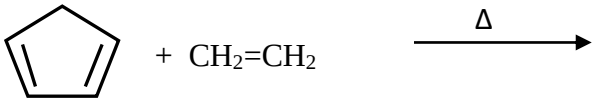
7. (a) Draw the *pi*-MO diagrams of (a) 1,3- butadiene and (b) allyl cation and explain their characteristic features. (8 Marks)

   (b) What are Diels-Alder reactions? Using orbital symmetry, explain why a Diels–Alder reaction does not take place under photochemical reaction conditions. (6 Marks)

   (c) Draw the product (including stereochemistry) formed in each pericyclic reaction using curved arrows:

(i) 

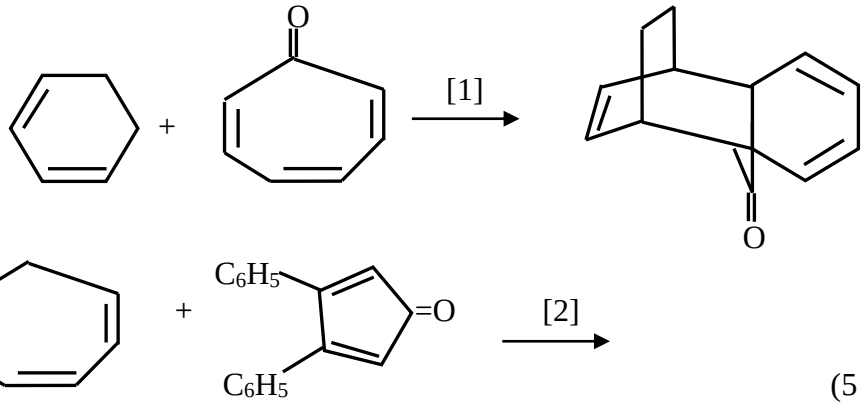
(ii) 

(iii) 

(6 Marks)

8. (a) What are pericyclic reactions/ Give important characteristics of these reactions and its various types. (5 Marks)

(b) What type of cycloaddition occurs in reaction below and under what conditions? Show the product formation with the help of curved arrows. Draw the product of a similar process [1] in reaction [2] s.



(5 Marks)

(C) Write a note on Sigmatropic reactions by explaining the concept of [1,3], [1,5] Hydrogen Shift and Carbon Carbon Shift. On the basis of Woodward Hoffmann rule explain under which conditions reaction is thermally or photo chemically allowed. (5 Marks)

(d) What are 1,3- dipolar reactions? Explain by giving two suitable examples. (5 Marks)

9. (a) What is meant by Cheletropic reactions? How Cheletropic addition is related to Diels Alder reaction? Explain by giving suitable examples of both. (6 Marks)

(b)Explain the following terms with the help of suitable example:

(i) Conrotary & Disrotory motion

(ii) Suprafacial Shift & Antrafacial Shift (10 Marks)

(c) Explain orbital symmetry giving correlation diagram for cycloaddition of ethylene and 1,3-butadiene. (4 marks)