

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: I MSc/MSc
BRANCH: CHEMISTRY

SEMESTER : IX/III
SESSION : MO/2025

SUBJECT: CH504 ADVANCED ORGANIC SYNTHESIS

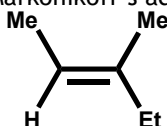
TIME: 3 Hours

FULL MARKS: 50

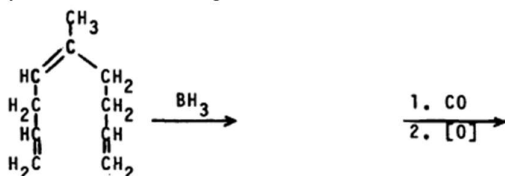
INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

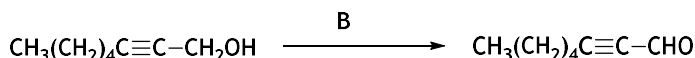
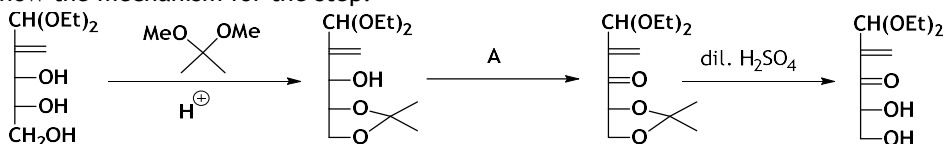
- Q.1(a) What is Brown's Ipc reagent? Show the schematic mechanism to explain the stereospecificity and regioselectivity towards the hydroboration for following compound. Why does overall anti-Markonikoff's addition obserb? CO BL
[1+4] 1 I



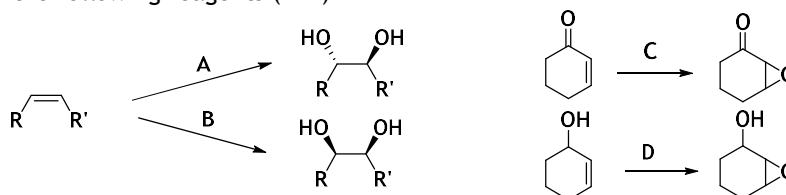
- Q.1(b) Discuss about cotrathermodynamic isomerization through hydroboration with suitable example. Complete the following reaction. [3+2] 2 II



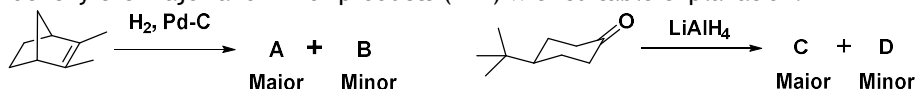
- Q.2(a) For the following conversion reactions, identify the reagents mentioned as A and B and show the mechanism for the step. [5] 2 II



- Q.2(b) Identify the following reagents (A-D) [5] 2 III



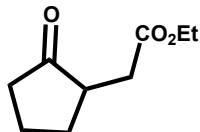
- Q.3(a) Identify the major and minor products (A-D) with suitable explanation. [5] 3 I



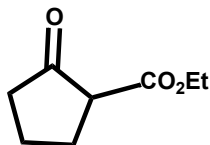
- Q.3(b) What are the differences between homogeneous and heterogeneous catalysis? What are Wilkinson's and Crabtree's catalyst? [5] 3 II

PTO

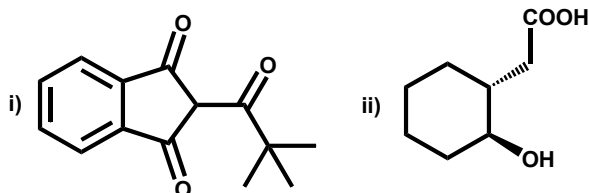
- Q.4(a) Show the disconnection of following compound and outline the steps for synthesis with activation of beta-position by (i) formation of enamine (ii) using ester group. [3+2] 3 IV



Show the two possible pathways of disconnection of the following compound and comment on the better pathway.



- Q.4(b) Show the disconnection of the following compounds and outline stepwise synthesis with mechanism. [2+3] 4 II



- Q.5(a) What is the significance of E-factor in green chemistry? What is the old industrial method of synthesis of polycarbonate? How did it make green? [2+3] 4 II
- Q.5(b) What is atom economy? Give two examples of reactions with 100 % atom economy. Write the steps and mechanism to prepare paracetamol from phenol having 100 % atom economy at each steps. Do you consider it as green synthesis? [2+3] 4 III

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