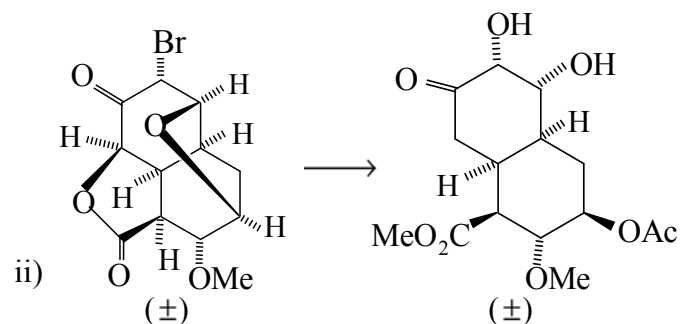
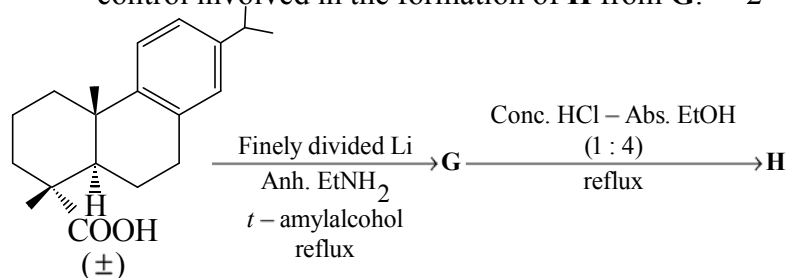


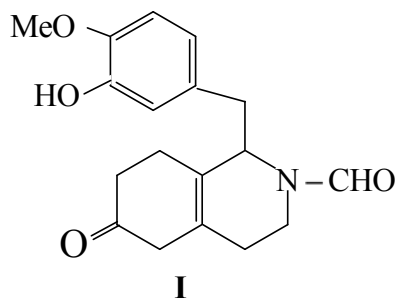
[4]



- e) Identify the products **G** and **H** of the following reactions. Discuss mechanistic and stereochemical control involved in the formation of **H** from **G**. 2



- f) Predict with appropriate justification the predominant Grewe-type cyclization product of the following compound **I**. 1



Ex/SC/CHEM/PG/CORE/TH/XIV-O/2022

M. Sc. (CHEMISTRY) EXAMINATION, 2022

(4th Semester, CBCS)

ORGANIC CHEMISTRY SPECIAL

PAPER – XIV-O

Time : Two hours

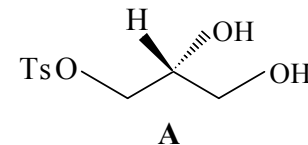
Full Marks : 40

(20 marks for each unit)

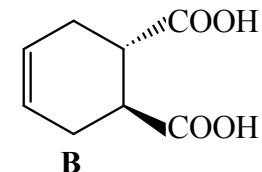
Use a separate answer script for each Unit.

UNIT: O-4141

1. a) Design the synthesis of the compound **A** starting from a suitable easily accessible enantiopure chiral compound applying Chiron approach. 4



- b) Describe the synthesis of the compound **B** using *l*-menthol as a chiral auxiliary and account for its enantioselectivity. 3



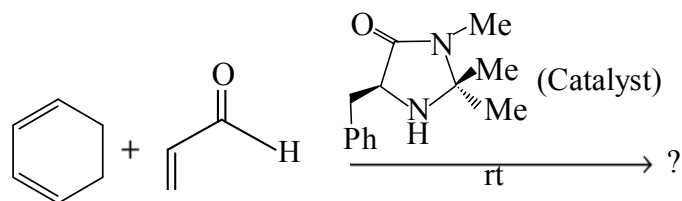
- c) Suggest the product **C** when *N*-tosyl-*S*-tryptophan reacts with *n*-butylboronic acid in refluxing toluene. Predict the product **D** when α -methylacrolein reacts with cyclopentadiene at -78°C

[Turn over

[2]

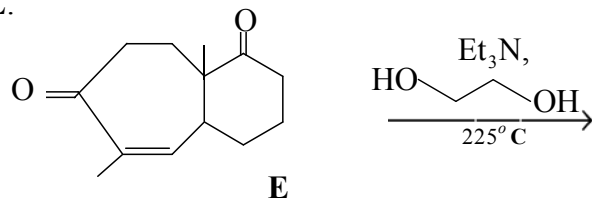
in the presence of catalytic amount of **C**. Provide an explanation of your answer with due emphasis to the enantioselectivity of this reaction. 1+1+3

- d) Elaborate the role of chiral N-heterocyclic carbene towards asymmetric benzoin condensation. 4
- e) Predict the major product of the following reaction with emphasis to the stereochemical feature. 4



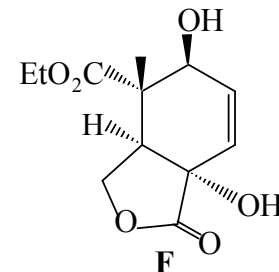
UNIT: O-4142

2. a) Predict the product of the following reaction. Mechanistically explain its formation. Describe one stereochemical advantage of choosing the following molecule **E** as the starting material of this reaction. Delineate the synthesis of molecule **E** starting from an appropriately functionalized 1, 2-diol in 3 steps involving ring expansion reaction as the key step (mechanism is not required). Justify use of all the reagents involved in this 3-step conversion of diol to **E**. 4½

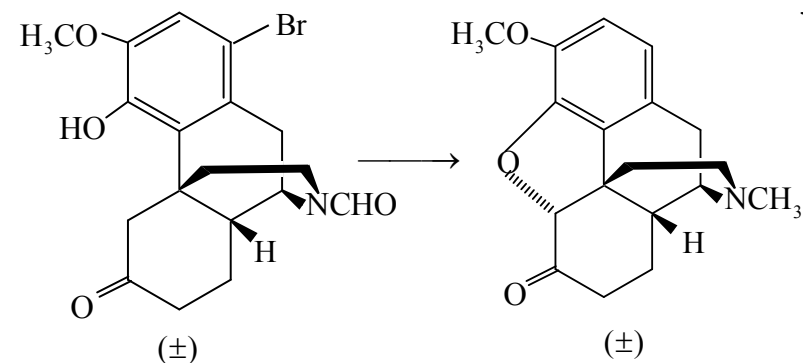


[3]

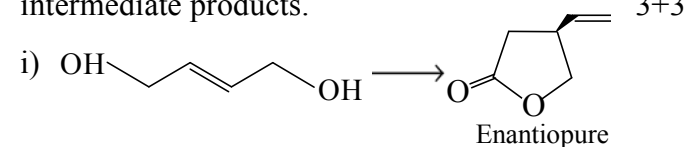
- b) Delineate synthesis of the following racemic compound **F** starting from two achiral compounds. Rationalize the mechanistic and stereochemical aspects for its formation. 3½



- c) Carry out the following transformation. Show all the intermediate products. Mechanism is not required. 3



- d) Illustrate the steps involved in the following two conversions highlighting mechanistic explanations for the first step only in both the cases. Show all the intermediate products. 3+3



[Turn over