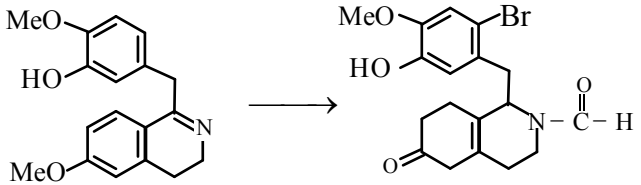
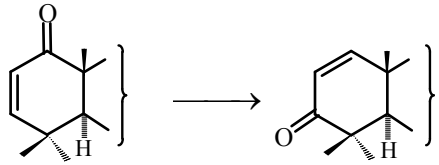
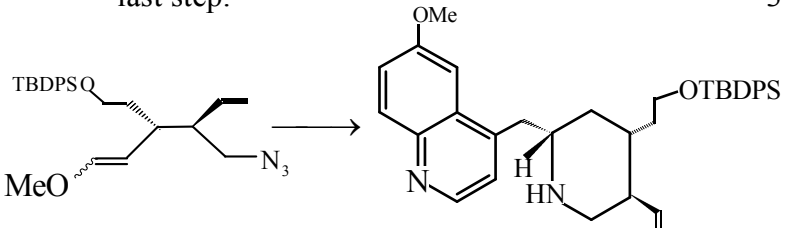


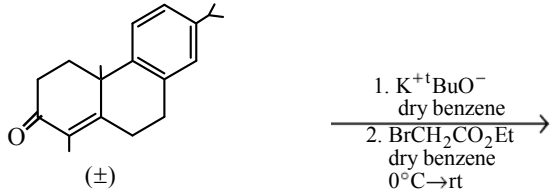
d) Mechanistically account for the following conversion clearly indicating all the steps involved. 3



e) Carry out the following transformation. Show all the intermediate steps (mechanism is not required). Highlight the stereochemical control involved in the last step. 3



f) Draw structures of all the stereoisomeric products of the following reaction. Suggest proper mechanistic and stereochemical explanations for their formation. 2



M. Sc. (Chemistry) Examination, 2023

(4th Semester)

Paper: XIV–O

[Organic Chemistry Special]

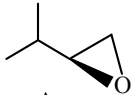
Time : Two Hours Full Marks : 40

(20 marks for each unit)

Use a separate answer script for each unit.

Unit: O-4141

1. a) Design a scheme for the sysnthesis of the compound **A** starting from a suitable and easily available enantiopure chiral compound applying Chiron approach. 4



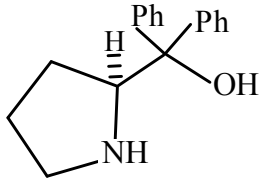
A

b) Describe the enantioselective synthesis of *R*, *R*-DIPAMP using *l*-menthol as the chiral auxiliary (only suggest the steps with reagents, no mechanism is needed). 4

c) Delineate the enantioselective synthesis of *S*-ornithine using a chiral phase transfer catalyst. Rationalize the stereochemical outcome of the enantioselective step in the entire sequence. 4

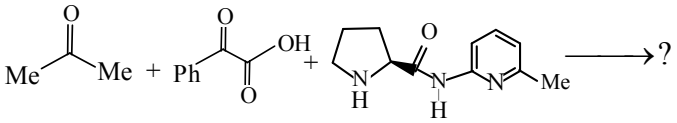
d) When the compound **B** reacts with borane-tetrahydrofuran, the compound **C** is obtained which

fails to reduce acetophenone to 1-phenylethanol. Identify the compound **C**. But if further amount of BH_3-THF is added to the above reaction mixture, acetophenone is quantitatively reduced within one minute where *R*-1-phenylethanol is obtained with very high enantiomeric excess. Logically explain the observed rate enhancement and stereochemical features of this reaction. 2+2



B

e) Suggest the major product of the following reaction with the assignment of configurational descriptor at the stereocentre.

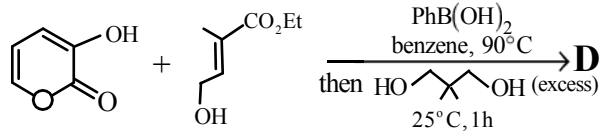


If the methyl ester of the above-mentioned (catalyst) α-keto acid is used as one of the substrates, the reaction is poorly enantio-selective and extremely sluggish. Rationalize the stereochemical outcome of this reaction. 1+3

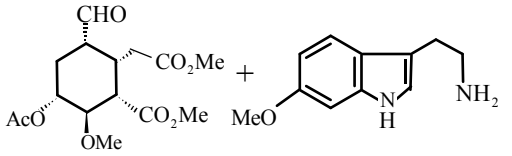
Unit: O-4142

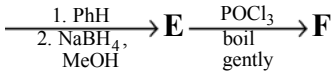
2. a) Identify the products **D**, **E** and **F** in the following reactions. Propose a suitable mechanistic and stereochemical interpretations (as and when necessary) for their formations. 3+3

i)

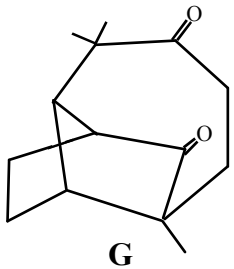


ii)





b) How would you synthesize (+)-longifolene starting from the following racemic diketone **G**? 3



G

c) Illustrate the steps involved in the following conversion. Show all the intermediate products. Mechanism is not required. 3