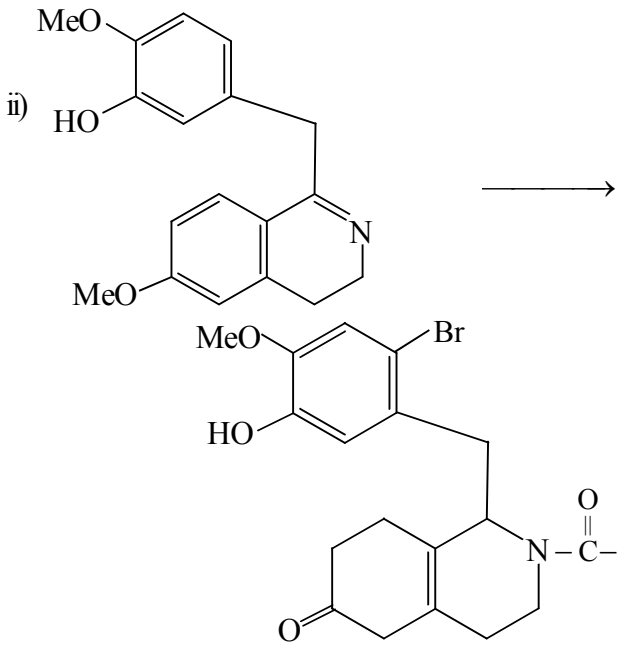
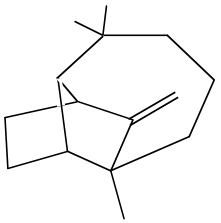
ii)



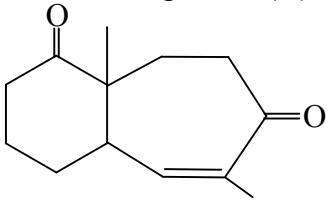
3

f) i) Predict the structure of longifolene hydrochloride. Explain its formation from longifolene **(Q)**. 2



Q

ii) Discuss the advantages of the intermediate **R** in Prof. Corey's synthesis of longifolene **(Q)**. 2



R

M. Sc. Chemistry Examination, 2019

(4th Semester)

Organic Chemistry Special

Paper - XIV-O

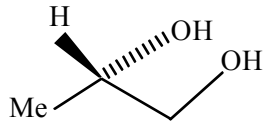
Time : Two hours Full Marks : 50

(25 marks for each unit)

Use a separate answerscript for each unit.

UNIT - O - 4141

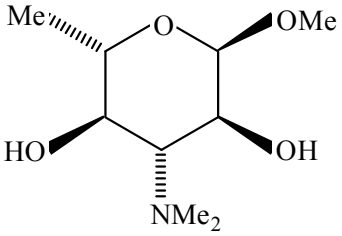
1. a) Design the synthesis of the compound **A** starting from a suitable easily available enantiopure chiral compound applying Chiron approach. 4



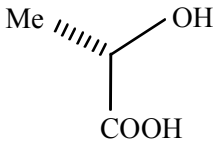
A

b) Describe the asymmetric synthesis of *l*-menthol which was developed by Prof. Ryoji Noyori. Highlight the stereochemical features of the cyclization step. 3

c) Discuss the synthesis of the compound **B** starting from the compound **C** and account for the stereochemical aspects of the steps involved (wherever applicable). 4



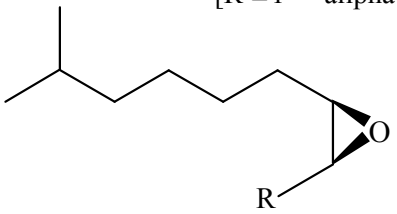
B



C

d) Suggest the steps for the asymmetric synthesis of the compound **D** using Sharpless asymmetric epoxidation in one of the steps [only mention the steps with reagents, no mechanism is needed]. 3

$[R \equiv 1^{o} - \text{aliphatic chain}]$

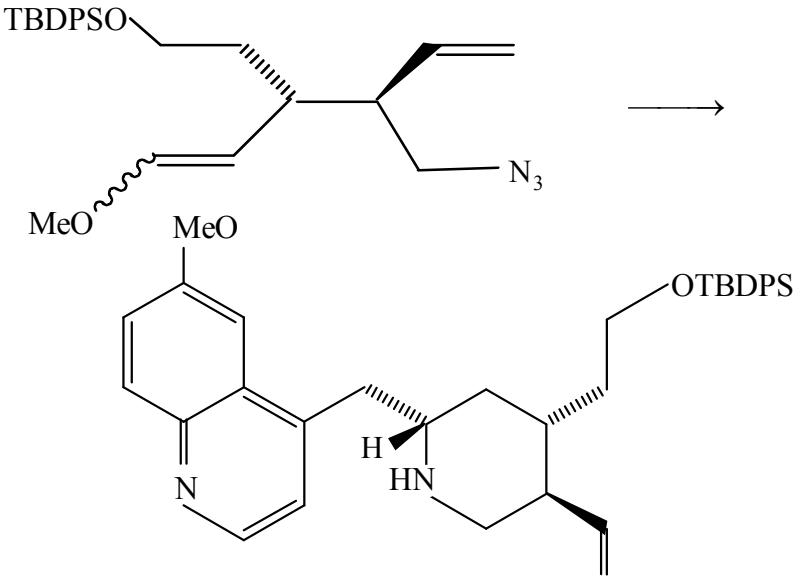


D

e) Predict the product **E** when S-BINOL, $LiAlH_4$ and EtOH are mixed together in equimolecular proportion. When **E** reacts with acetophenone, suggest the absolute configuration of the major product obtained from acetophenone with proper justification. 3

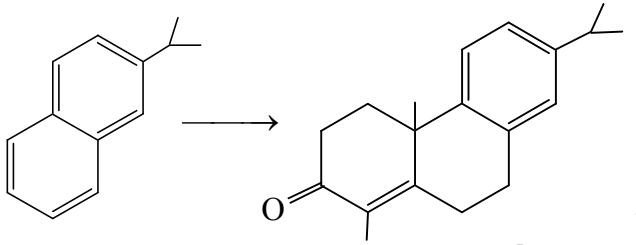
$$\mathbf{K} + \mathbf{L} \xrightarrow[\text{then aq } NH_4Cl]{\text{MeLi}} \mathbf{M} + \mathbf{N} \xrightarrow[\text{AcOH}]{\text{HCl(g) saturated}} \mathbf{O} + \mathbf{P}$$

d) Illustrate the steps involved in the following conversion highlighting the stereochemical control involved in the last step. 3



e) Carry out the following transformations. Show all the intermediate products (mechanism is not required).

i)



3

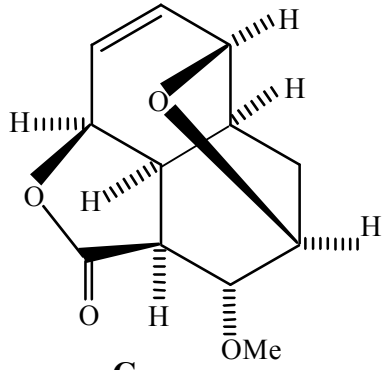
f) Suggest the structure of the product **F** obtained in the reaction of D-fructose with dry acetone in the presense of anhydrous $ZnCl_2$ followed by PCC oxidation. If *E*-stilbene is treated with H_2O_2 in CH_3CN in the presence of catalytic amount of **F**, predict the outcome with absolute configuration of the stereocentres in the predominant product. 1+3

g) Define the term "Sustainability" 1

h) Logically suggest the product when n-propylbenzene reacts with potassium permanganate adsorbed on neutral alumina. 3

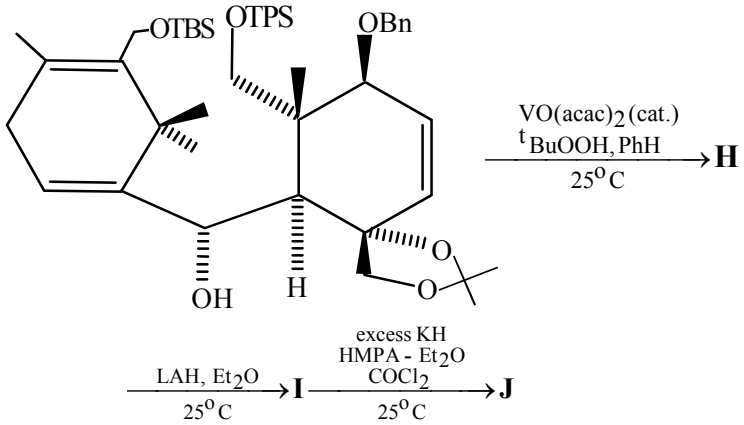
UNIT - O - 4142

2. a) Discuss synthesis of the following compound **G** (racemic variety) from two achiral starting materials. Suggest appropriate mechanistic and stereochemical inter-pretations as necessary. 5



G

b) Predict the products **H**, **I** and **J** of the following reactions (mechanism is not required). Mention at least three reasons for which $COCl_2$ was chosen as the appropriate reagent for the last step of the following reaction sequence. 3



c) Identify the products (**K** to **P**)of the the following reactions. Commment on the stereochemistry of any newly generated chiral center(s) of all the products formed. 4