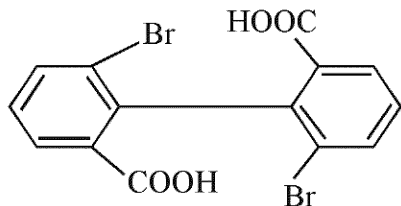
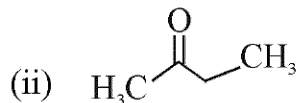
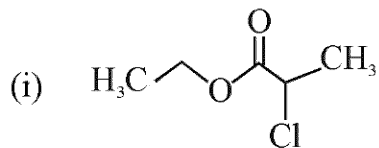


through atoms 4, 1, 1' and 4' and predict whether the compound is chiral :



8. (a) Are the two faces of the double bonds in the following compounds homotopic, enantiotopic or diastereotopic ? Give, where possible, a suitable descriptor for the face oriented towards you :



- (b) Draw the structural formula of (R)-2-bromopentan-3-one and describe the topicity of the methylene and methyl hydrogen atoms.

(PG509)

Roll No. ....

S.C.No.—701103

M. Sc. EXAMINATION, 2021

(First Semester)

(Main/Re-appear) (2020/2019)

CHEMISTRY

19CHE103

Organic Chemistry-I

Time : 3 Hours

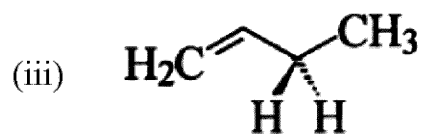
Maximum Marks : 80

**Note :** Attempt any *Four* questions. All questions carry equal marks.

- (a) Discuss with example, the cross conjugated bonding in organic molecules.

(b) Briefly explain, homoaromaticity and antiaromaticity.
- (a) Elaborate the significance of Hammett substituent constant.

- (b) What are the major methods to determine mechanism of the reaction ?
3. (a) Write down the important methods for the generation of carbocations.  
 (b) Compare classical and non-classical carbocations.
4. Write notes on the following :  
 (a) ion pairs in  $S_N1$  mechanism  
 (b) phenonium ion in NGP  
 (c)  $S_E^2$  and  $S_E^i$ .
5. (a) Find out the absolute configuration of L-cysteine according to the R/S nomenclature :
- $$\begin{array}{c} \text{COOH} \\ | \\ \text{H}_2\text{N} - \text{C} - \text{H} \\ | \\ \text{CH}_2\text{SH} \end{array}$$
- (b) Draw as Newman projections the different conformations of ethylene glycol ( $\text{HO}-\text{CH}_2-\text{CH}_2-\text{OH}$ ) and label each clearly.
- (c) Sketch the structure and decide whether the following compounds enantiomers or diastereomers :  
 (i) (E)-1,2-dichloroethene and (Z)-1,2-dichloroethene  
 (ii) (+)-tartaric acid and meso-tartaric acid.
6. (a) Explain stereoisomerism in cyclohexanes including the 1, 2-, and 1, 4-disubstituted ones.  
 (b) Describe Stereochemical aspects of *cis* and *trans* decalins.
7. (a) Give detailed description of the optical activity in the absence of chiral carbon in case of cyclophanes and spiranes taking suitable example.  
 (b) How many stereoisomers are there of 4-*sec*-butylcyclohexanol ? Give a reason.  
 (c) Draw the following biphenyl derivative in a projection which corresponds to it being viewed along an axis passing



(b) Write notes on the following :

- (i) stereospecific and stereoselective reaction
- (ii) % enantioselectivity and % diastereoselectivity.

(c) What products are formed when :

- (i) maleic acid
- (ii) fumaric acid

is treated with bromine in the cold and in the absence of light ? Justify your answer from a consideration of the reaction mechanism.

9. (a) Label the hydrogen atoms at the prochirality centres in the following formulae with *pro-R* or *pro-S* :

