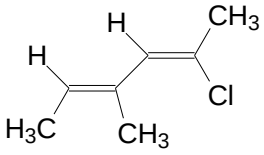
STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2023-24)

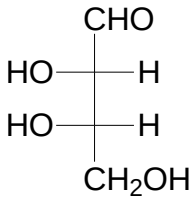
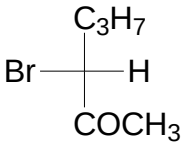
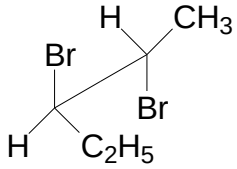
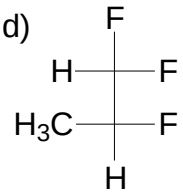
M.Sc. DEGREE EXAMINATION, NOVEMBER 2023
BRANCH IV- CHEMISTRY
FIRST SEMESTER

COURSE : CORE
PAPER : ORGANIC CHEMISTRY - I
SUBJECT CODE : 23CH/PC/OC14
TIME : 3 HOURS MAX.MARKS : 100

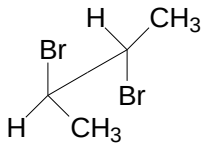
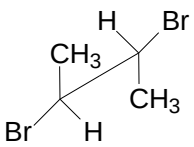
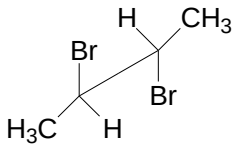
Q. No.	SECTION A (10 x 1 = 10 marks) Answer ALL Questions	CO	KL
1	1,3,5-cycloheptatrienyl anion is a) homo-aromatic b) benzenoid aromatic c) anti aromatic d) non-benzenoid aromatic	1	1
2	[8]-annulene contains protons of the type a) diatropic only b) both diatropic and paratropic c) neither diatropic nor paratropic d) paratropic only	1	1
3	If atleast one, but not all of the chiral centres are opposite, between two stereoisomers. they are called a) enantiomers b) D-isomers c) L-isomers d) diastereomers	1	1
4	Allenes have a) plane of symmetry b) centre of symmetry c) axis of symmetry d) None of the above	1	1
5	Resolution of racemic mixture can be done by a) physical method b) chemical method c) biological method d) all the above methods	1	1
6	Mutarotation is not possible in a) fructose b) glucose c) sucrose d) mannose	1	1
7	The most stable conformation of decalin is a) cis-decalin b) trans-decalin	1	1
8	The compound which shows low axial interaction of the following is a) fluorocyclohexane b) bromocyclohexane c) iodocyclohexane d) methylcyclohexane	1	1
9	The compound that is not used to trap benzyne intermediate is a) cyclopentadiene b) furan c) anthracene d) benzene	1	1
10	The intramolecular nature of claisen rearrangement can be studied by a) isotopic labelling b) trapping of intermediate c) product analysis d) salt effect	1	1

..2

Q. No.	SECTION – B (10 x 1 = 10 marks) Answer ALL Questions	CO	KL
11	Depict the Frost circles of cyclopentyl anion.	1	2
12	Write the structure of aza[9]annulene.	1	2
13	Present the structure of (R)-*trans*-cyclooctene.	1	2
14	Name the following compound based on stereochemistry. 	1	2
15	Depict the Re face of acetophenone.	1	2
16	What is the proper stereochemical product formed when trans-3-hexene reacts with Br_2 molecule?	1	2
17	State which is more stable: 1,3-cyclohexane dicarboxylic acid or 1,2-cyclohexane dicarboxylic acid.	1	2
18	Draw the half chair conformation of cyclohexane.	1	2
19	Write the Taft equation.	1	2
20	What is the value of k_H/k_D ratio for a kinetic reaction?	1	2

Q. No.	SECTION C (4 x 6 = 24 marks) ANSWER ANY FOUR QUESTIONS	CO	KL
21	Explain axial and helical chirality with suitable example.	3	3
22	Identify the R, S, D, L configurations of the following. (1+2+2+1) a)  b)  c)  d) 	3	3

23	Describe stereospecific and stereoselective reactions with suitable examples.	3	3
24	Perform a complete conformational analysis of cis- and trans-1,2-dimethylcyclohexane compounds.	3	3
25	How is the chemical reactivity of substituted carboxylic acids compared with their structure to prove linear free energy relationship?	3	3

Q. No.	SECTION – D (4 x 8 = 32 marks) ANSWER ANY FOUR QUESTIONS	CO	KL
26	a) Draw the structure of the following compounds. i) (R)-2,6-dimethylspiro[3,3]heptane (2+1+1+1) ii) (E)-benzyloxime iii) (Z)-N-methylbenzamide iv) Z-2,3-dichlorobutene b) What is enantiomeric excess? Mention its significance. (3)	4	4
27	a) Identify the following conformations of 2,3-dibromobutane and predict how are they related with one another? (6)  (i)  (ii)  (iii) b) How is threo-2,3-dibromohexane synthesized? (2)	4	4
28	Discuss the double asymmetric synthesis through enantioselective reactions with suitable examples. (8)	4	4
29	a) How are the cis- and trans- forms of 9-methyldecalin decide on their stability and reactivity? (5+3) b) Discuss on the Baldwin rules for ring closure.	4	4
30	How are the following methods useful to determine the mechanism of organic reactions? (3+3+2) a) product identification b) stereochemical studies c) cross-over experiments	4	4

Q. No.	SECTION – E (2 x 12 = 24 marks) ANSWER THE FOLLOWING	CO	KL
31 a	(i) Draw the wedge, Fischer, sawhorse and newman projection formula of 2(R)-bromo-3(S)-chloropentane. (ii) Discuss the chirality of S and P based compounds with suitable examples. (8+4) (or)	5	5
31 b	(i) Describe cationic and thermal methods of racemization with suitable examples. (6) (ii) How are racemic modifications resolved by the formation of diastereoisomers? Give any two examples. (6)		
32 a	(i) Discuss the conformations of cyclohexane and cyclopentane. (ii) How are the conformational changes effected by the reduction reaction of cyclohexanone. (8+4) (or)	5	5
32 b	(i) What are the thermodynamic and kinetic requirements of reactions? (6+6) (ii) How is the mechanism of Benzoin condensation decided using kinetic study?		

****