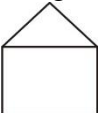
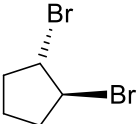
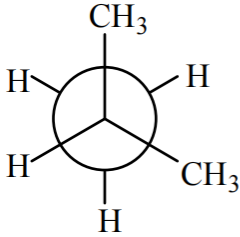
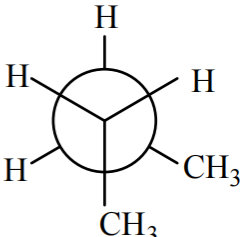
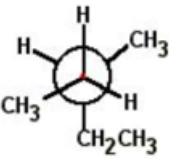
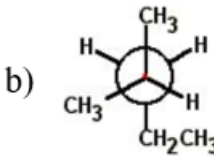
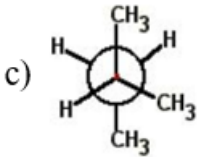
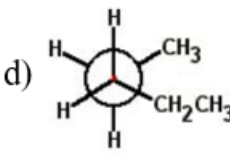



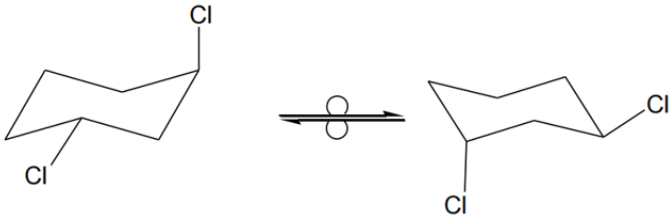

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2023-24 & thereafter)

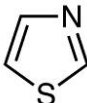
M.Sc. DEGREE EXAMINATION, NOVEMBER 2024
BRANCH IV- CHEMISTRY
FIRST SEMESTER

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

MAX.MARKS : 100

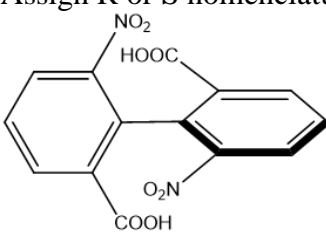
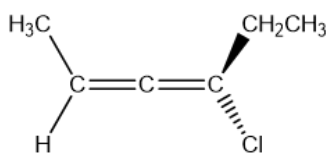
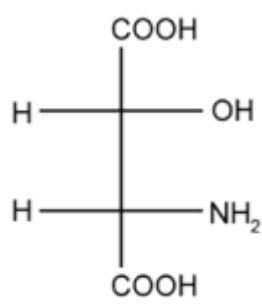
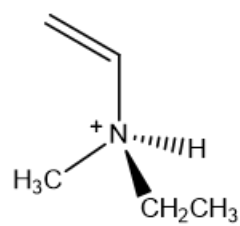
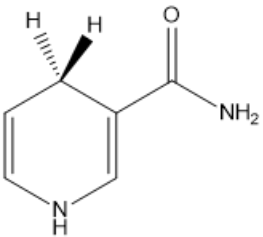
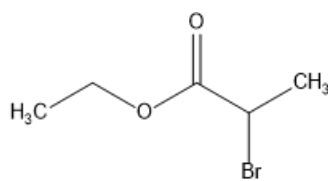
Q. No.	SECTION A (10 x 1 = 10 marks)	CO	KL
1.	The IUPAC name of the following compound is <div style="text-align: center;"></div> <p>a) bicyclo [0 1 1] pentane b) bicyclo [2 1 0] pentane c) bicyclo [2 1 0] hexane d) bicyclo [1 1 0] hexane</p>	1	1
2.	The number of nodal planes in the π_4^* orbital of benzene is _____. a) 0 b) 1 c) 2 d) 3	1	1
3.	The name of the following molecule is _____ 1,2 – dibromocyclopentane. <div style="text-align: center;"></div> <p>a) cis b) trans c) dextro (+) d) laevo (-)</p>	1	1
4.	The boat conformation of cyclohexane is less stable than the chair because of a) angle strain b) 1,3-diaxial interaction c) torsional strain d) all of the above	1	1
5.	The following molecules are <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"></div> <div style="text-align: center;"></div> </div> <p>a) Diastereomers b) Enantiomers c) Constitutional isomers d) Homomers</p>	1	1
6.	Choose the correct Newman projection for 3-methylpentane. <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center; margin: 10px;"></div> <div style="text-align: center; margin: 10px;"></div> <div style="text-align: center; margin: 10px;"></div> <div style="text-align: center; margin: 10px;"></div> </div>	1	1

7.	The absolute configuration of the following molecule is  a) R b) P c) M d) None of the above	1	1
8.	The two conformations given below are  a) Identical b) Mirror images c) diastereomers d) enantiomers	1	1
9.	The energy required to rotate n-butane molecule about the carbon-carbon bond is called a) Rotational b) Torsional c) Angle d) Diaxial	1	1
10.	Which of the following molecules is aromatic? 	1	1

Q. No.	SECTION B (10 x 1 = 10 marks)	CO	KL
	Fill in the blanks	2	2
11.	 In the above compound, the lone pair on _____ is involved in the aromatic sextet.	2	2
12.	In asymmetric synthesis, the reaction should pass through a _____ transition state.	2	2
13.	A product like transition state leads to _____ type of reaction.	2	2
14.	According to Baeyer's strain theory, all cyclic molecules are _____.	2	2
15.	Cumulenes with _____ number of double bonds show optical isomerism.	2	2

	Answer in a line or two.	2	2
16.	Differentiate between racemic mixture and meso compound.	2	2
17.	Give the eclipsed Sawhorse form of propane.	2	2
18.	What is secondary isotope effect?	2	2
19.	Write the structure of 12-annulene.	2	2
20.	Give the most stable conformer of cis-1,3-dimethylcyclohexane.	2	2

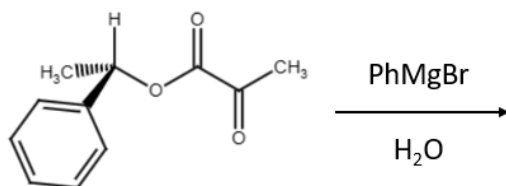
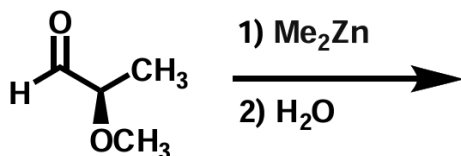
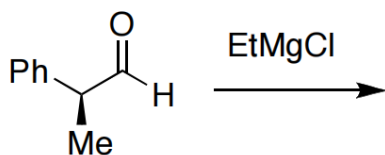
Q. No.	SECTION C (4 x 6 = 24 marks)	CO	KL
	Answer any four questions.		
21.	Illustrate the difference between point, axial, planar and helical chirality with suitable examples.	3	3
22.	Predict the stereochemistry of Evans-Aldol reaction.	3	3
23.	Demonstrate the conformational behaviour of piperidine.	3	3
24.	Derive the Hammett equation and explain the significance of the reaction and substituent constants.	3	3
25.	Using suitable examples, explain the difference between stereospecific and stereoselective reactions.	3	3

Q. No.	SECTION D (4 x 8 = 32 marks)	CO	KL
	Answer any four questions.		
26.	Assign R or S nomenclature to the following compounds. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	4	4
27.	a) Indicate whether the following compounds have Re or Si nomenclature. (4) <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> b) How can a racemic mixture of 2-pentanol be resolved through the formation of diastereomers? (4)	4	4

28.	Analyse and predict the rate of chromic acid oxidation of axial and equatorial cyclohexanols.	4	4
29.	Outline the importance of cross-over experiments and isotopic labeling in determining reaction mechanisms. Give suitable examples.	4	4
30.	Examine the stability and stereochemical aspects of cis and trans 1,2-, 1,3- and 1,4-disubstituted cyclohexanes.	4	4

Q. No.	SECTION E (2 x 12 = 24 marks)	CO	KL
	Answer the following questions.		
31.	a) Convert the following Fischer projection into Newmann and Sawhorse projection. (6) <div style="text-align: center;"> </div> b) Analyse the thermodynamic and kinetic control of addition reactions with respect to 1,2- and 1,4-addition. (6) <p style="text-align: center;">(OR)</p>	5	5
32.	a) Predict the products of the reaction given below and explain the stereochemistry. (6) <div style="text-align: center;"> </div> b) Identify the chiral centres in the following compounds. (6) <div style="text-align: center;"> </div>		

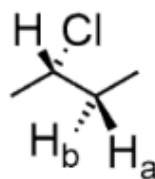
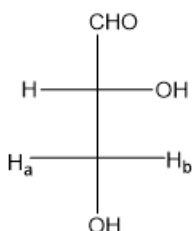
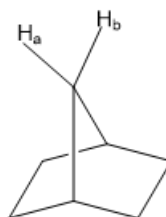
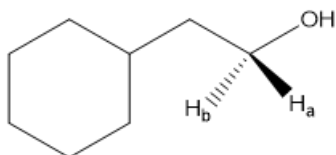
33. a) Predict the products in the following reactions with stereochemistry. (6)



- b) Evaluate the conformation and reactivity of cis and trans decalins. (6)

(OR)

34. a) Identify if the hydrogens marked a and b are homotopic, enantiotopic or diastereotopic. (8)



- b) Convert the following molecules into the zig-zag perspective formula. (4)

