Name

Enrolment No:

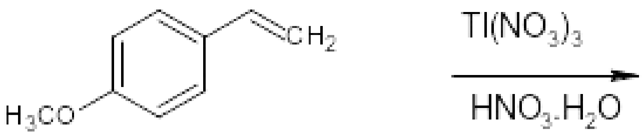
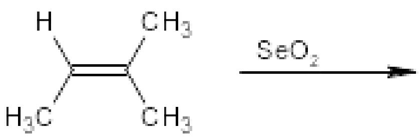
Course: CHEM7026P **(End Semester Examination May 2022)**
Programme: M.Sc Chemistry **Semester: II**
Course Name: Organic reagents and spectroscopic analysis of Organic compounds

Time: 03 hrs. **Max. Marks:100**

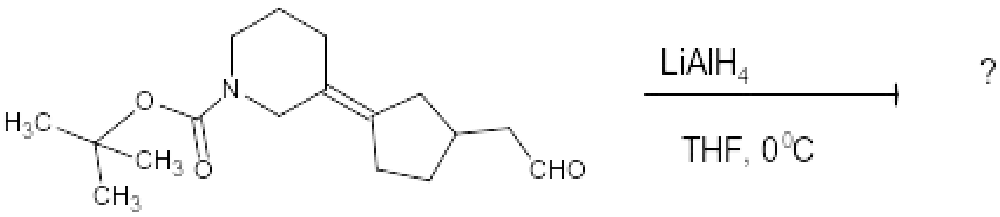
Instructions: Read all the below mentioned instructions carefully and follow them strictly:

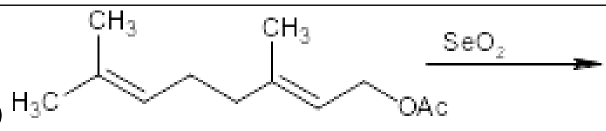
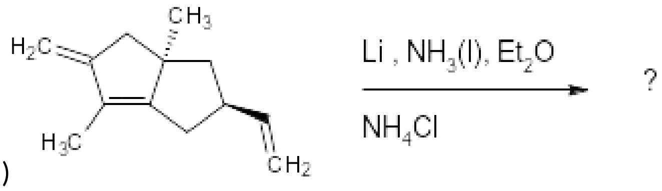
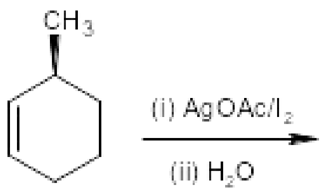
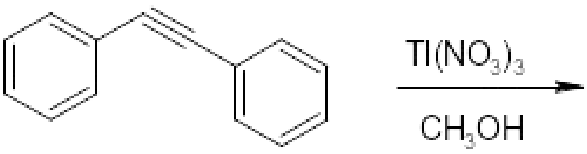
1) **Write your enrolment number on the top left of the question paper**
2) **Do not write anything on the question paper except your enrolment number**
3) **Attempt all part of a question at one place only**
4) **Internal choice is given for question number 9 and 11 only**

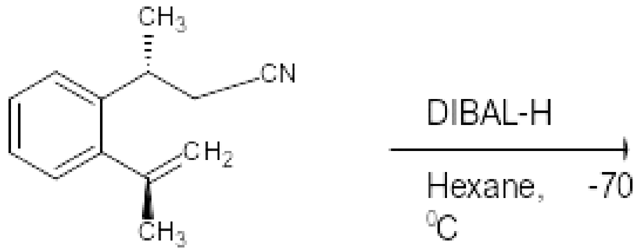
Section - A (Attempt all **FIVE** Questions)

1.	Find the structure of the organic compound whose mass spectrum shows m/e values as 114, 85, 72, 57, 41 and 29.	**[4]**	**CO2**
2.	Explain the product with a suitable mechanism: 	**[4]**	**CO1**
3.	Explain the fragmentation of methyl butanoate, toulene and para methyl phenol.	**[4]**	**CO2**
4.	Predict the product with mechanism: 	**[4]**	**CO1**
5.	How will you differentiate between the two isomeric alcohols, 2-pentanol and 3-methyl-2-butanol on the basis of their CMR spectra?	**[4]**	**CO2**

SECTION - B
(Question No. 6, 7 and 8 are Compulsory); attempt any one from 9A & 9B

6.	Write the product with proper explanation:  (i)	**[5+5]**	**CO1**

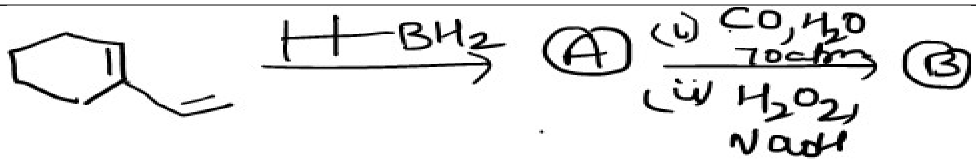
	(ii) 		
7.	(i) How can the number and position of CMR signals help in the identification of four isomeric alcohol ($C_4H_{10}O$)? (ii) Discuss the factors which influence the IR frequency.	**[4+6]**	**CO2**
8.	Complete the following reaction with suitable mechanism: .(i)  (ii) 	**[5+5]**	**CO1**
9.A	(i). A compound with molecular formula $C_{12}H_{14}O_4$ gives the following signals in the NMR spectrum: i) Unsymmetrical multiplet = δ7.4 (7.1 squares) ii) quartet = δ4.4 (7.2 squares) iii) Triplet = δ1.5 (10.8 squares) Deduce the structure. (ii). Give possible product in the following reactions and suggest the reasoning for the formation of the product: 	**[6+4]**	**CO3** **CO1**
9B	(i). A compound with molecular formula $C_5H_8O_3$ gave the following spectral information:	**[6+4]**	**CO3** **CO1**

	(i) UV: 283 nm ε_{max} 22 (ii) IR: 3000-2500, 1715, 1342 cm^{-1} (iii) NMR: δ2.12, singlet (3H), δ2.60, triplet(2H), δ2,25, triplet (2H) and δ11.1, singlet (1H) Find the structural formula of the compound. (ii), Give possible product in the following reactions and suggest the reasoning for the formation of the product. 		

SECTION - C

(Question No. 10 is Compulsory; Attempt anyone from question numbers 11A & 11B)

10.	(i) A compound with the molecular formula $C_8H_8O_2$ shows in its IR spectrum bands at 3200 and 1700 cm^{-1}. The PNMR spectrum shows a peak at δ10.9 as a 1 H singlet. The other two peaks being at δ7.2 singlet (5H) and δ (2H). Its CNMR has four peaks in the region δ130 while one at high field δ 41.1 and at low field δ 178.3 to this position. Suggest a structure to the compound. (ii) Calculate the approximate ratio of peak at m/z value 190, 192, 194 and 196 of 1-bromo,2,3- dichloro propane in mass spectrometer. (iii) Write the product with explanation :	**[8+4 +8]**	**CO3 CO2 CO1**

			
11A.	(i) A compound ($C_9H_{10}O_2$), shows a molecular ion at m/z =150 and a base peak at m/z = 135. Its infrared spectrum shows a strong band at 1680 cm-1. Its PNMR spectrum shows signals in three distinct regions at δ 2.3 (3H, singlet); δ 3.6 (3H, singlet) and δ 6.4-7.5 (4H, a pair of doublets J = 8 Hz). Assign a structure. (ii) What is $Tl(NO_3)_3$? Give its application in organic chemistry. **OR**	**[10+10]**	**CO3 CO1**
11B.	(i) Write notes on i) Nuclear overhauser effect ii) Proton exchange reactions. (ii) What is SeO_2? Give its four application in organic chemistry.	**[10+10]**	**CO3 CO1**