

Name:	 <b>UPES</b> UNIVERSITY WITH A PURPOSE
Enrolment No:	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**Online End Semester Examination, May 2021**

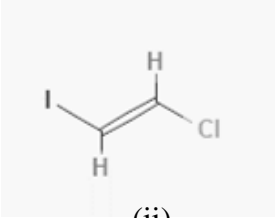
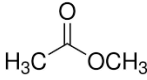
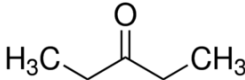
**Course: Organic reagents and spectroscopic analysis of Organic compounds**  
**Program: M.Sc(Chemistry)**  
**Course Code: CHEM7026P**

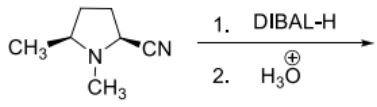
**Semester: II**  
**Time 03 hrs.**  
**Max. Marks: 100**

**SECTION A**

1. Each Question will carry 5 Marks
2. Instruction: Complete the statement / Select the correct answer(s)

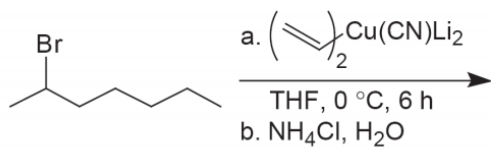
S. No.	Question	CO
Q 1	<p>A) The product of the following reaction is _____</p> $R-CH=CH_2 + Ti(ONO_2)_3 \xrightarrow{MeOH}$ <p>a) 1,2-glycol dimethylether            b) 2-methylether            c) 2-alkyl ethylene glycol            d) Both a) and c)</p> <p>B) LiAlH<sub>4</sub> reduces epoxides to _____. The hydride ion is transferred to the _____ hindered side of the epoxides.</p> <p>C) Reduction of esters with atleast 2 equivalents of DIBAL-H provides _____ while with 1 equivalent of DIBAL-H provides _____</p>	<p><b>CO1</b></p> <p><b>[1+2+2]</b></p>
Q2	<p>A) The catalyst used in Suzuki reaction is _____</p> <p>B) 'Heck reaction' is palladium-catalyzed C-C coupling between _____ and _____ in the presence of a base</p> <p>C) Dissolving _____ in ammonia yields blue coloured reducing mixture. This blue coloured solution is rich in _____</p>	<p><b>[1+2+2]</b></p> <p><b>CO1</b></p>
Q3	<p>A) McLafferty rearrangement involves the migration of _____ followed by the cleavage of β-bond:</p> <p>a) α-hydrogen            b) β-hydrogen            c) γ-hydrogen            d) δ-hydrogen</p> <p>B) Molecular ion peak is often not visible in case of _____ and _____ compounds</p> <p>C) The base peak in the mass spectrum of toluene appears at m/e value _____ due to the formation of _____.</p>	<p><b>[1+2+2]</b></p> <p><b>CO2</b></p>

Q4	<p>A) Determine the number of NMR signals for 1,2-dichloropropane</p> <p>a) 2 b) 3 c) 4 d) 5</p> <p>B) The distance between the centres of the two adjacent peaks in a multiplet is usually _____ and is called the _____</p> <p>C) _____ tells us whether the two protons are in close proximity within a molecule. It leads to signal _____ of the other proton when one proton is irradiated.</p>	<p>[1+2+2]</p> <p>CO2</p>
Q5	<p>A) For a compound, the mass spectrum has the m/e values: 124, 122 (low abundance), 43 (base peak), 107, 109. The organic compound is:</p> <p>a) <i>n</i>-propylchloride b) <i>n</i>-propylalcohol c) <i>n</i>-propylbromide d) None</p> <p>B) Determine the multiplicity in <sup>1</sup>H-NMR for each of the following compounds:</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <math display="block">  \begin{array}{c}  \text{CH}_3 \\    \\  \text{H}_3\text{C}-\text{C}-\text{CH}_2\text{Br} \\    \\  \text{CH}_3  \end{array}  </math> <p>(i)</p> </div> <div style="text-align: center;">  <p>(ii)</p> </div> </div> <p>C) Among two isotopes of carbon, _____ is NMR active while _____ is not.</p>	<p>[1+2+2]</p> <p>CO3</p>
Q6	<p>A) Determine the number of C-NMR signals for benzene molecule:</p> <p>a) 1                      b) 2                      c) 3                      d) 4</p> <p>B) Predict the number of signals in a proton-decoupled <sup>13</sup>C-NMR spectrum of each compounds: _____</p> <p>a)                       b) </p> <p>C) In bromo compounds, M<sup>+</sup> and (M<sup>+</sup>+2) peaks are formed in the intensity ratio _____ while in chloro compounds, it is _____</p>	<p>[1+2+2]</p> <p>CO3</p>
<p><b>SECTION B</b></p> <p><b>1. Each question will carry 10 marks</b></p> <p><b>2. Instruction: Write short / brief notes</b></p>		
Q 1	Explain reduction reaction using LiAlH <sub>4</sub> for various organic compounds with examples	CO1

Q 2	Give the possible products of the following reaction and give reaction mechanism:  	CO1								
Q 3	How will you distinguish between isomeric alcohols with molecular formula C <sub>4</sub> H <sub>10</sub> O by mass spectroscopy?	CO2								
Q 4	Propose a structural formula for carboxylic acid with molecular formula C <sub>6</sub> H <sub>12</sub> O <sub>2</sub> :  <table border="1" data-bbox="194 598 560 777"> <thead> <tr> <th>H-NMR</th> <th>C-NMR</th> </tr> </thead> <tbody> <tr> <td>1.08 (s, 9H)</td> <td>179.29</td> </tr> <tr> <td>2.23 (s, 2H)</td> <td>46.82</td> </tr> <tr> <td>12.1 (s, 1H)</td> <td>30.62</td> </tr> </tbody> </table>	H-NMR	C-NMR	1.08 (s, 9H)	179.29	2.23 (s, 2H)	46.82	12.1 (s, 1H)	30.62	CO3
H-NMR	C-NMR									
1.08 (s, 9H)	179.29									
2.23 (s, 2H)	46.82									
12.1 (s, 1H)	30.62									
Q 5	Write a note on Sharpless Asymmetric epoxidation with examples	CO1								

### Section C

1. Each Question carries 20 Marks.
2. Instruction: Write long answer.

Q1	<p>A) a) Give <i>any two</i> preparation methods of Lithium organocuprates with reactions  b) Complete the following reaction and discuss the properties of the reaction:</p>  <p style="text-align: center;">OR</p> <p>B) Explain preparation methods (<i>any two</i>) and applications (<i>any three</i>) of organosilicone compounds</p>	CO1
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