


Name:			
Enrolment No:			
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination, December 2022</b>			
<b>Course: Organic Chemistry II</b> <b>Program: B.Sc. (H) Chemistry &amp; Int. B.Sc.-M.Sc. Chemistry</b> <b>Course Code: CHEM 2021</b>		<b>Semester: III</b> <b>Time : 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions: Attempt all the questions.</b>			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
S. No.		Marks	CO
Q 1	Explain Reimer Tiemann reaction with mechanism.	4	CO3
Q 2	Give Reasons: i) Benzaldehyde has m-directing group whereas Phenol has o,p-directing. ii) Alcohols undergo nucleophilic substitution reactions.	4	CO1
Q 3	Which structural feature is required in any compound to respond positively towards chloroform test. Select the compounds among the following, which will give chloroform test: CH <sub>3</sub> OH, CH <sub>3</sub> CH <sub>2</sub> OH, CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> OH, CH <sub>3</sub> CHOHCH <sub>3</sub>	4	CO2
Q 4	Use any suitable method to obtain the followings from CH <sub>3</sub> MgBr: i) CH <sub>4</sub> ii) CH <sub>3</sub> CH <sub>2</sub> OH	4	CO2
Q 5	What happens when NH <sub>3</sub> is made to react with the following: i) Formaldehyde ii) Acetaldehyde iii) Acetone	4	CO2
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q 6	Discuss the following reactions with mechanism: i) Aldol condensation ii) Perkin reaction	10	CO3
Q 7	Write down the IUPAC names of the following compounds: i) $\begin{array}{c} \text{CH}_2\text{-CH}_2\text{-CH}_2 \\   \qquad   \\ \text{CHO} \quad \text{CHO} \end{array}$ ii) CH <sub>3</sub> CH(OH)CH <sub>2</sub> COCH <sub>3</sub> iii) CH <sub>3</sub> CH(Cl)CH=CH-COOH	10	CO1

	$  \begin{array}{c}  \text{CH}_3 \\    \\  \text{HOOC}-\text{CH}-\text{CH}-\text{COOH} \\    \\  \text{CH}_2\text{CH}_3  \end{array}  $ <p>iv)</p> <p>v) <math>\text{CH}_3\text{CH}_2\text{CONH}_2</math></p>		
Q 8	<p>Arrange the following as instructed. Also, provide suitable reason to support your answer.</p> <p>i) <math>\text{ClCH}_2\text{COOH}</math>, <math>\text{Cl}_3\text{C}-\text{COOH}</math>, <math>\text{Cl}_2\text{CHCOOH}</math>, <math>\text{CH}_3\text{COOH}</math> (increasing order of acidity)</p> <p>ii) <math>\text{CH}_3\text{CHO}</math>, <math>\text{CH}_3\text{COCH}_3</math>, <math>\text{HCHO}</math> (increasing order of reactivity)</p> <p>iii) <math>\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}</math>, <math>\text{CH}_3\text{CHOHCH}_3</math> (increasing order of reactivity towards Na)</p>	10	CO1
Q 9	<p>Complete the reactions:</p> <p>i) <math display="block">  \begin{array}{c}  \text{COOH} \\  \diagup \\  \text{CH}_2 \\  \diagdown \\  \text{COOH}  \end{array}  \xrightarrow[300^\circ\text{C}]{\Delta}  </math></p> <p>ii) <math>\text{CH}_3\text{CH}(\text{OH})\text{COOH} \xrightarrow{\Delta}</math></p> <p>iii) <math>\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NH}_3 \longrightarrow</math></p> <p>iv) <math>\text{CH}_2=\text{CH}-\text{CHO} + \text{CH}_2(\text{COOC}_2\text{H}_5)_2 \xrightarrow{\text{C}_2\text{H}_5\text{O}^-}</math></p> <p>v) <math>\text{C}_2\text{H}_5\text{COOH} + \text{SOCl}_2 \longrightarrow</math></p>	10	CO2
<b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b>			
Q 10	<p>a) An organic compound <math>\text{C}_7\text{H}_8</math> (A) on chlorination in the presence of light gives another compound <math>\text{C}_7\text{H}_7\text{Cl}</math> (B), which on reaction with aq. KOH gives compound <math>\text{C}_7\text{H}_8\text{O}</math> (C). Compound C on distillation with CaO, gives benzene. Compound B on reaction with KCN forms <math>\text{C}_8\text{H}_7\text{N}</math> (D) which on hydrolysis forms <math>\text{C}_8\text{H}_8\text{O}_2</math> (E). Compound E on reaction with soda-lime forms compound A again. Identify the compounds A to E and complete the reaction series.</p> <p>b) An organic compound A with molecular formula <math>\text{C}_3\text{H}_6\text{O}</math> readily oxidizes to <math>\text{C}_3\text{H}_6\text{O}_2</math> (B). Compound A reacts with ethyl magnesium iodide to give compound <math>\text{C}_5\text{H}_{12}\text{O}</math> (C), which on dehydration gives <math>\text{C}_5\text{H}_{10}</math> (D). With acidified <math>\text{KMnO}_4</math>, compound D oxidizes to compound B and compound E (<math>\text{C}_2\text{H}_4\text{O}_2</math>). Identify the compounds from A to E and complete the reaction series.</p>	10+10	CO2

	<b>OR</b>		
	<p>Conversions:</p> <ul style="list-style-type: none"> <li>i) Benzene to DDT</li> <li>ii) Methane to acetaldehyde</li> <li>iii) Methyl cyanide to butane</li> <li>iv) Acetylene to 1-butyne</li> <li>v) Propyne to Iodoform</li> </ul>	<b>20</b>	
Q 11	<ul style="list-style-type: none"> <li>a) An alkene on ozonolysis gives one mole each of acetaldehyde and acetone. Deduce the structure and name of the alkene.</li> <li>b) What happens when: <ul style="list-style-type: none"> <li>i) Formaldehyde reacts with KOH.</li> <li>ii) Acetaldehyde reacts with phenyl hydrazine.</li> <li>iii) 1-butyne reacts with dilute H<sub>2</sub>SO<sub>4</sub> in the presence of HgSO<sub>4</sub>.</li> <li>iv) Ethylene glycol reacts with nitric acid.</li> <li>v) Benzene diazonium chloride reacts with HBr in the presence of Cu<sub>2</sub>Br<sub>2</sub>.</li> </ul> </li> <li>c) How will you distinguish among primary, secondary and tertiary alcohols. Explain with the help of reactions.</li> </ul>	<b>5+ 15+ 5</b>	<b>CO<sub>2</sub></b>