

Name:			
Enrolment No:			
UPES End Semester Examination, December 2023			
Course: Organic Chemistry II Program: B.Sc. (H) Chemistry Course Code: CHEM 2021		Semester: III Time : 03 hrs. Max. Marks: 100	
Instructions: Attempt all the questions.			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	Explain Hoffmann bromamide reaction with mechanism.	4	CO3
Q 2	Give Reasons: i) The boiling point of carboxylic acids is higher than the alcohols of similar molecular weight. ii) Acetic acid is stronger than propionic acid.	4	CO1
Q 3	Explain the method to distinguish among α , β and γ -hydroxy acids with the help of chemical reactions.	4	CO2
Q 4	Use any suitable method to obtain the following from propanoic acid: i) Ethane ii) Propanoic anhydride	4	CO2
Q 5	Explain the action of heat on the following: i) Succinic acid ii) Malonic acid	4	CO2
SECTION B (4Qx10M= 40 Marks)			
Q 6	Complete the following reactions and discuss the mechanism: i) $HCHO \xrightarrow{KOH}$ ii) $C_6H_5CHO + (CH_3CO)_2O \xrightarrow{CH_3COONa}$	10	CO3
Q 7	Write down the IUPAC names of the following compounds: $ \begin{array}{ccccccc} & & Br & & & & \\ & & & & & & \\ CH_3 & - & CH_2 & - & C & - & CH_2 & - & CH & - & CHO \\ & & & & & & & & & & \\ & & & & H & & CH_3 & & & & \end{array} $	10	CO1

	<p>ii) </p> <p>iii) </p> <p>iv) </p> <p>v) </p>		
Q 8	<p>Arrange the following as instructed. Also, provide suitable reason to support your answer.</p> <p>i) CH_3COCl, $(\text{CH}_3\text{CO})_2\text{O}$, $\text{CH}_3\text{COOCH}_3$ (increasing order of reactivity)</p> <p>ii) $\text{CH}_2=\text{CH}-\text{Cl}$, $\text{CH}_3\text{CH}_2\text{Cl}$, $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$ (increasing order of reactivity for nucleophilic substitution)</p> <p>iii) $\text{C}_6\text{H}_5\text{OH}$, $\text{C}_6\text{H}_5\text{CHO}$, $\text{C}_6\text{H}_5\text{COOH}$ (increasing order of reactivity for electrophilic substitution)</p>	4+4+2	CO1
Q 9	<p>Complete the reactions:</p> <p>i) $\text{CH}_2 = \text{CH} - \text{CHO} \xrightarrow{\text{HBr}}$</p> <p>ii) $\text{CH}_3\text{COCl} + \text{C}_6\text{H}_6 \xrightarrow{\text{Anhy. AlCl}_3}$</p> <p>iii) $\text{CH}_3\text{CONH}_2 + \text{HNO}_2 \rightarrow$</p> <p>iv) $\text{CH}_3\text{COCH}_3 + \text{CHCl}_3 + \text{KOH} \rightarrow$</p> <p>v) $\text{C}_6\text{H}_5\text{OH} + \text{CO}_2 + \text{NaOH} \xrightarrow{120-140^\circ\text{C}}$</p>	10	CO2
<p>SECTION-C (2Qx20M=40 Marks)</p>			
Q 10	<p>a) An organic compound $\text{C}_3\text{H}_6\text{O}$ (A) is oxidized by Fehling's solution and gives silver mirror with Tollen's reagent. 'A' gives on reduction $\text{C}_3\text{H}_8\text{O}$ (B). On reaction with HBr followed by heating with Mg, 'B' gives 'C', which reacts with ethylene oxide to give $\text{C}_5\text{H}_{12}\text{O}$ (D). On oxidation, 'D' gives $\text{C}_5\text{H}_{10}\text{O}_2$ (E). Identify the compounds 'A' to 'E'.</p> <p>b) An organic compound $\text{C}_4\text{H}_6\text{O}_4$ (A) on heating gives $\text{C}_4\text{H}_4\text{O}_3$ (B), which in turn reacts with NH_3 to give $\text{C}_4\text{H}_5\text{O}_2\text{N}$ (C). Both 'B' and 'C' may be hydrolyzed to 'A'. With Cl_2, 'A' gives a monochloro compound 'D', which reacts with aqueous KOH to give $\text{C}_4\text{H}_4\text{O}_5\text{K}_2$ (E). Identify the compounds 'A' to 'E'.</p> <p style="text-align: center;">OR</p>	10+10	CO2

	<p>Conversions:</p> <ul style="list-style-type: none"> i) Methane to toluene ii) Ethane to acetaldehyde iii) Methyl chloride to acetic acid iv) Ethylene to 2-butanone v) Acetic acid to ethylene 	20	
Q 11	<ul style="list-style-type: none"> a) Discuss the reaction of acetaldehyde with $C_6H_5NHNH_2$. Also, discuss the mechanism. b) What happens when: <ul style="list-style-type: none"> i) Acetaldehyde reacts with NH_3. ii) Acetone reacts with Cl_2. iii) Formaldehyde reacts with KOH. iv) Ethylene glycol reacts with conc. H_2SO_4. v) Benzene diazonium chloride reacts with KI. c) Write down the structures of: <ul style="list-style-type: none"> i) Maleic acid ii) Lactic acid <p>Mention their IUPAC names as well.</p>	5+ 15+ 5	CO₂