

**NATIONAL OPEN UNVERSITY OF NIGERIA**

**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE & APPLIED SCIENCES**

 **APRIL/MAY, 2019 EXAMINATIONS**

**CHM 305-Organic Chemistry III SEMESTER (3 UNITS)**

**INSTRUCTION: Answer Question 1 and any 4 Questions**

**TIME: 2 ½ HOURS**

**QUESTION 1**

(a). Show how ethanol can be prepared by hydration of alkene. *(9 marks)*

(b). Write short note on preparation of ether using Williamson synthesis *(6 marks)*

(c). Using appropriate reagents and catalyst, discuss how aromatic alkanone can be prepared by Friedel-Craft acylation? *(3 marks)*

(d). Give the structure of 3-hydroxypropanal and phenylethanal *(4 marks)*

**QUESTION 2**

(a). Explain the process of production of alcohol in large and concentrated quantity from Maize starch.  *(6 marks)*

(b). Water is more acidic than alcohol discuss. *(5 marks)*

(c). Using Lucas test differentiate between primary, secondary and tertiary alcohols.

 *(1 marks)*

 **QUESTION 3**

(a)(i). Differentiate between symmetrical and unsymmetrical ethers. *(5 marks)*

 (ii). Draw the structure of the following: *(4 marks)*

* Oxetane
* Oxane
* Oxalane
* 1,4-Dioxane

(b). Complete the table below: *(3 marks)*

Formula, IUPAC names, Common names and Sources of Some Carboxylic acids

|  |  |  |  |
| --- | --- | --- | --- |
|  Formula  | IUPAC Name | Common Name | Source |
| HCOOH  | Methanoic acid  | Formic acid  | Vinegar Plant  |
| CH3COOH | Ethanoic acid |  | Animal Products  |
|  | Propanoic acid | Propanionic acid |  |
| CH3(CH2)2COOH |  | n-Butyric acid  | Rancid butter |
| CH3(CH2)14COOH | Hexadecanoic acid |  |  |
|  | Octadecanoic acid  | Stearic acid  |  |

 **QUESTION 4**

(a). Predict the type of alcohol formed when these carbonyl compounds are treated with

Grignard reagent. *(3 marks)*

* Aldehyde ------------→
* Ketone ---------------→

(b). Write short note on Michael nucleophlic addition to α, β-Unsaturated carbonyl

 compound. Take Benzalacetophenine and ethylmanoate as the Michael donor and

 acceptor. *(9 marks)*

 **QUESTION 5**

(a). Write the equation for electrophilic substitution reactions of thiophene with:

 H2SO4, CH3COCl and HNO3. *(3 marks)*

(b). Give five medicinal/ physiological uses of pyridine derivatives. *(6 ½ marks)*

 (c). List four industrial uses of Oxalic acid*. (1 mark)*

 (d). Classify these amino acids into Neutral, Acidic and Basic amino acids.

 *(1 ½ marks)*

* Aspatic and Glutamic acid.
* Glycine and Cystine
* Lysine and Arginine

**QUESTION 6**

(a). Discuss the Oxidation and Acylation reactions of glucose. *(6 marks)*

 (b). Write on the classification of carbohydrate. *(6 marks)*