



# THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

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**MAIN EXAMINATION**

**MAY – JULY 2018 TRIMESTER**

**FACULTY OF SCIENCE**

**DEPARTMENT OF CHEMISTRY**

**PART TIME PROGRAMME**

**CHEM 105: ORGANIC CHEMISTRY II**

**Date: JULY 2018**

**Duration: 2 Hours**

**INSTRUCTIONS: Answer Question ONE and any other Two Questions**

Q1. a) Draw the structures of the following compounds; **(6 marks)**

- i) 2-methylpropanoic acid
- ii) Ethanoic propanoic acid anhydride
- iii) Dipropyl disulphide
- iv) 2-butane thiol
- v) 2-methyl propanenitrile
- vi) *o*-cresol

b) Name the following compounds using IUPAC or acceptable common names. **(5 marks)**

c) Explain the following chemical observations: **(4 marks)**

- i) Phenols are more acidic than alcohols.
- ii) Ethane thiol has a lower boiling point than ethanol.

d) Predict the products A-E of the following reactions: **(5 marks)**

✖

e) Write IUPAC names of the following heterocyclic compounds: **(4 Marks)**

✖

f) Complete the following table by filling in the structure of the compound formed when ethanal and propanone react with the indicated reagents. **(6 marks)**

	Reagent	Propanal	Propanone
i.	Acidified Potassium Permanganate		
ii.	Sodium Hydrogen Sulphate		
iii.	Sodium Borohydride		

Q2. a) Draw the structure of urea and write equations to show four possible reactions of urea. **(5 marks)**

b) Discuss the classification of amines and give an example of each class **(5 marks)**

c) Using ethanoyl chloride as an example, discuss four reactions that acid chlorides undergo. Include equations of the specific reactions. **(10 marks)**

Q3. a) Draw the structure of ethanoic acid anhydride and write equations to show four reactions of ethanoic acid anhydride. **(5 marks)**

b) Using ethanoic acid as an example, discuss five reactions that carboxylic acids undergo. Include equations of the specific reactions. **(10 marks)**

- c) Discuss the preparation and properties of sulphides and disulphides. **(5 marks)**
- Q4. a) i) Describe any two methods of preparing phenols. **(6 marks)**
- ii) Write equations to show how phenols react with the following reagents: **(8 marks)**
- i) Zn, Heat
- ii) Concentrated sulphuric acid
- iii) Nitrous acid
- iv) Br<sub>2</sub>, H<sub>2</sub>O
- b) Using ethanamide as an example, discuss five reactions that amides undergo. Include equations of the specific reactions. **(6 marks)**
- Q5. a) Draw the structure of epoxyethane and write equations to show four possible reactions of epoxyethane. **(10 marks)**
- b) Using ethylamine as an example, discuss five reactions that amines undergo. Include equations of the specific reactions. **(10 marks)**

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