NATIONAL OPEN UNVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF PURE & APPLIED SCIENCES
2021_2 EXAMINATION 45678

COURSE TITLE: ORGANIC CHEMISTRY III **COURSE CODE: CHM305**
TIME ALLOWED 3 HOURS **CREDIT UNIT: 3**
INSTRUCTIONS: ANSWER QUESTION 1 AND ANY OTHER 4 QUESTIONS

1. a. Define an alcohol and enumerate its classification (5 Marks)
   b. What do you understand by the word epoxides? (3 Marks)
   c. Write the general formula and functional group of carboxylic acid (3Marks)
   d. What is the name of this compound? $CH_3CH_2CH_2CH_2CH_2CH_2CHO$ (3 Marks)
   e. What do you understand by heterocyclic compounds? (3.5 Marks)
   f. Enumerate the chemical characteristics of proteins (4.5 Marks)

2. a. Explain how to test for the presence of aldehydes using silver mirror test (3 Marks)
   b. Mention four uses of starch (4 Marks)
   c. Predict the products of the following reactions (5 Marks)
      i. $CH_3CH_2OH + PCl_5 \rightarrow$
      II. $C_2H_5OH + 3O_2 \rightarrow$

3. a. Write the two functional group isomers of C_2H_6O (4 Marks)
   b. What is esterification? Show the reaction between ethanol and ethanoic acid (4 Marks)
   c. Mention four uses of Oxalic acid (4 Marks)

4 a. Define the following terms (5 Marks)
   i. Saponification
   ii. Acid value
   iii. Rancidification

iv. Soaps

v. Iodine value

b. Show the reaction between ethanoic acid and sodium hydroxide (4 Marks)

c. Write three uses of aldehydes and ketones (3 Marks)

5. a. What are amino acids? Relate them to protein (4 Marks)

b. Give the general formula of Grignard reagent and explain all the terms (3 Marks)

c. Name the following compounds using IUPAC nomenclature (5 Marks)

i. $CH_3CH(NH_2)COOH$

ii. $NH_2CH_2CH_2CH_2COOH$

iii. $CH_3CH_2CH_2COCH_3$

iv. CH_3-O-CH_3

v. CH_3CH_2-O-CH_3

6. a. Mention four physical tests used to determine the purity of fat and oil (4 Marks)

b. Using “Lucas test” differentiate between primary, secondary and tertiary alcohol (4 Marks)

c. Draw the structure of the most imprudent member of six-membered rings heterocycle and name it (4 Marks)