



NATIONAL OPEN UNIVERSITY OF NIGERIA PLOT 91, CADASTRAL ZONE,
NNAMDI AZIKIWE EXPRESSWAY, JABI – ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2023_1 POP EXAMINATION.

COURSE CODE: CHM 305

COURSE TITLE: ORGANIC CHEMISTRY III

COURSE UNIT: 3

INSTRUCTION: Answer question 1 and any other three questions

Time: 3 hours

QUESTION 1

1. (a) i. What are polypeptides?

- ii. Write vivid note on composition of protein
- iii. Explain what you understand to be fats and oil
- iv. How do you test for presence of Thiophene? **(10 Marks)**

(b) i. How do you dictate the presence of protein in a substance using millon's and biuret test

ii. Explain the fermentation and reduction processes of glucose **(6 Marks)**

(c) i. Draw the chemical structure of methylcyclohexane

- ii. State three physical properties of malonic ester
- iii. List three derivatives of pyridine
- iv. State the increasing order of five-membered heterocyclic reactivity when compared to benzene **(9 Marks)**

QUESTION 2

2(a). Distinguish between Primary, secondary and tertiary alcohol. **(6 Marks)**

(b). What is symmetrical and Unsymmetrical Ethers? **(6 Marks)**

(c). Classify the following ethers as symmetrical and asymmetrical

$\text{CH}_3\text{CH}_2\text{CH}_2\text{-O-CH}_2\text{CH}_2\text{CH}_3$, $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{-O-CH}_2\text{CH}_3$, $\text{CH}_3\text{-O-CH}_2\text{CH}_3$ **(3 Marks)**

QUESTION 3

3. (a) State what you understand by epoxides **(2 Marks)**
- (b) What are the common names of CH_3OCH_3 , $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ and $\text{CH}_3\text{CH}_2\text{OCH}_3$? **(6 Marks)**
- (c) Explain the types of structural isomerism that ether exhibit **(7 Marks)**

QUESTION 4

4. (a) State five (5) physical properties of Ether **(5 Marks)**
- (b) Discuss the production of alcohol by fermentation of carbohydrate **(4 Marks)**
- (c)i. Explain the preparation of ether under the following headings:
- ii. dehydration of an alcohol
 - iii. Williamson synthesis
 - iv. action of diazomethane on alcohols **(6 Marks)**

QUESTION 5

5. (a) i. using equations, write the formation of acyl chlorides from
- ii. Acids
 - iii. Salts of the acids **(6 Marks)**
- (b) i. Discuss the chemical reactions of acid anhydrides under the following subheadings
- ii. Hydrolysis
 - iii. Ester formation
 - iv. Friedel craft acylation **(9 Marks)**

QUESTION 6

6. (a) Name the classes of heterocyclic compounds **(3 Marks)**
- (b) List examples of five membered and six-membered **(7 Marks)**
- (c) Give the two classes of condensed heterocyclic compounds **(2 Marks)**
- (d) Discuss the Solubility of aldehydes and ketones **(3 marks)**