



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
**UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY, JABI - ABUJA.**  
**FACULTY OF SCIENCES**  
**DEPARTMENT OF PURE AND APPLIED SCIENCE**  
**2023\_2 EXAMINATIONS**

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**COURSE CODE:** CHM422  
**COURSE TITLE:** NATURAL PRODUCTS CHEMISTRY II  
**TIME:** 2 HOURS  
**INSTRUCTION:** Answer question one and any other three questions.

**QUESTION ONE**

- 1a. List three general methods of extraction of natural products 5 marks
- 1b. Explain how you would systematically (step by step) isolate terpene from lemon grass 6 marks
- 1ci. Write briefly on Soxhlet extractor 5 marks
- 1cii. Outline four different types of chromatographic techniques used in isolation of natural product 4 marks
- 1d. Compare and contrast between terpenes and alkaloids 5 marks

**QUESTION TWO**

2. Explain the following;
- i. Metabolic pathways [3 marks]
  - ii. Enzymes [3 marks]
  - iii. Antibiotics [3 marks]
  - iv. Fractionation [3 marks]
  - v. Sesquiterpenoid [3 marks]

**QUESTION THREE**

- 3ai. State Isoprene Rule. 2 marks
- 3aii. Draw the structure of isoprene 2marks

3bi. Which of the alkaloid is responsible for reflex action in human? 2 marks

3bii. Give three examples of Acyclic terpenes 3 marks  
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3c. Explain briefly morphine 6 marks

#### QUESTION FOUR

4a. Explain the chemistry or reason underlying the methods of isolating natural product 8 marks

4b. What are phytosterols? 4 marks

4c. List the three stages involved in conversion of terpenes to steroids 3 marks

#### QUESTION FIVE

5a Differentiate between the following pairs;

i. Carotene and Carotenoids 5 marks

ii. Terpene and Terpenoids 5 marks

iii. Sterol and Steroids 5 marks