



**NATIONAL OPEN UNIVERSITY OF NIGERIA PLOT 91, CADASTRAL ZONE,
NNAMDI AZIKIWE EXPRESSWAY, JABI-ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2025_2 EXAMINATIONS**

COURSE CODE: CHM 422

COURSE TITLE: NATURAL PRODUCTS 2

COURSE UNIT: 2

INSTRUCTION: Answer question one (1) and any other two.

Time: 2 hours

- 1a. List the five main classes of natural products (5 marks)
- b. Define natural Products (2 marks)
- c. i. What is the difference between primary and secondary metabolites? (4 marks)
ii. Give two examples each of a primary and secondary metabolite (4 marks)
iii. What is the role of chromatography in natural products research? (2 marks)
- d. Give three uses of natural products with relevant examples (9 marks-3 marks each for any 3)
- e. Outline the stages involved in the structural elucidation of natural products (4 marks)

- 2a. Define the terms terpenes and terpenoids. (4 marks)
- b. Classify terpenes based on number of isoprene units and give examples for each class (12 marks)
- c. State the isoprene rule (4 marks)

- 3a. List two pharmacological effects of alkaloids and give one example of an alkaloid for each effect. (6 marks)
- b. Classify alkaloids based on their chemical structure and give examples for each class. (10 marks)
- c. State the therapeutic applications and toxicological aspects of morphine and quinine (4 marks)

- 4a. Name and briefly describe two biosynthetic pathways for natural products. (4 marks)
- b. A pharmacologist discovers a natural from a tropical plant. Outline the steps they would take to determine its structure, assess its biological activity, and evaluate its potential as a drug candidate. (12 marks)
- c. What are Specialty or Specialized carbohydrates? Give two examples (4 marks)

- 5a. Define steroids and outline their basic structure. (4 marks)
- b. Discuss the biosynthetic pathway of corticosteroids, starting from cholesterol. Include the key intermediates and enzymes involved. (12 marks)
- c. What is the role of the enzyme cytochrome P450 in steroid biosynthesis? (4 marks)