



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

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**COURSE CODE: CHM 318**

**COURSE TITLE: NATURAL PRODUCT CHEMISTRY I**

**COURSE UNIT: 2**

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

**Time: 2 Hours**

**QUESTION 1**

- 1a) State the main synthetic steps for the production of pyrrolizidine-derived alkaloids in plants **(8 marks)**
- b) Draw the structures of the following;
- i. Cycloartenol **(6 marks)**
  - ii. Lanosterol **(6 marks)**
- c) Briefly explain the extraction of alkaloids from plant material **(5 marks)**
- d) Draw the structure of cholic acid **(5 marks)**

**QUESTION 2**

- 2a) Starting from precursors of isoprene (IPP and DMAPP), show the synthesis of lanosterol **(8 marks)**
- b) Define the following classes of alkaloids with examples
- i. True alkaloids **(3 marks)**
  - ii. Protoalkaloids **(3 marks)**
  - iii. Pseudoalkaloids **(3 marks)**
- c) State three applications of essential oils **(3 marks)**

**QUESTION 3**

- 3a) State the metabolic pathways of creating terpenoids **(5 marks)**
- b) State the isoprene units in
- i. Sesquiterpenes **(3 marks)**
  - ii. Sesterpenes **(3 marks)**
  - iii. Rubber **(3 marks)**
- c) Draw the structure of Capsidiol **(6 marks)**

#### **QUESTION 4**

- 4a) State four (4) sources of Nerolidol **(4 marks)**
- b) Briefly explain the following classes of terpenes with examples
- i. Monoterpenes **(4 marks)**
  - ii. Sesquiterpenes **(4 marks)**
  - iii. Diterpenes **(4 marks)**
- c) Draw the structure of cholesterol **(4 marks)**

#### **QUESTION 5**

- 5a) Define Steroidogenesis **(4 marks)**
- b) What are sterols? **(4 marks)**
- c) i. Enumerate the products of steroidogenesis **(6 marks)**
- ii. List three sources of steroids **(6 marks)**