DEPARTMENT OF CHEMISTRY
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

SECOND SEMESTER EXAMINATION 2021/2022

SESSION

COURSE CODE: CHM 526 UNITS: 2
COURSE TITLE: NATURAL PRODUCTS CHEMISTRY
TIME ALLOWED: 2 HOURS
INSTRUCTION: ANSWER ANY THREE (3) QUESTIONS.

Q1a) Differentiate using two examples between secondary and primary metabolites **(4 marks)**

b. i) What are terpenoids? **(2 marks)**

ii) How are they classified? **(2 marks)**

c. i) What is isoprene rule? **(2 marks)**

ii) How many isoprene units are in myrcene and caryophyllene. **(2 marks)**

d. How would you effect the following conversions?

i) Citral to Geraniol. **(2 marks)**

ii) L-Terpineol to Limonene. **(2 marks)**

e. i) Distinguish between a terpene and a terpenoid **(2 marks)**

ii) Give two examples of each **(2 marks)**

Q2 a Briefly define the term 'Polyketides' **(3 marks)**

b. Discuss the biological importance of any three Polyketides found in nature **(5 marks)**

c. Sarting with Shikimic acid, biosynthesize three important amino acids used as

intermediate of natural products?
(5 marks)

d. With the aid appropriate schemes, provide biosynthetic routes that led to the production of Rutin and Formononetin
(7 marks)

Q3a. State five uses of essential oils/volatiles
(5 marks)

b. What are steroids?
(2 marks)

c. What the common categories of steroids?
(3 marks)

d. Which class of natural products do the following compounds belong?
i) Quinine
ii) Umbelliferone
iii) Camphol
iv) Quercitin
v) Erythromycin A
(5 marks)

e. Draw by means of broken lines and indicate the units in each of these natural products:
Limonene, Linalool, Thymol, Cadinene, Caryophyllyllene and Mycophenolic acid
(5 marks)

Q4. a. Convert D - (+) - Allose from Fischer- to its Haworth's projection formula, giving the names of the new structures
(4 marks)

b. Predict and justify any 2 sugars that will generate the same crystalline osazone derivative as D – (+) - Glucose
(5 marks)

c. Show that L – (-) - Threose can yield one ring strain free lactone ring derivative, while, L - (-) – Arabinose can yield 2 same types of lactone.
(5 marks)

d. L – (-) – Tagatose in alkaline $CuSO_4$ solution can be oxidized via a rearrangement reaction to L – (-) – Talonic acid and a brick red precipitate. Justify

(6 marks)