JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES
UNIVERSITY EXAMINATIONS: 2017/2018 ACADEMIC YEAR
THIRD YEAR SECOND SEMESTER EXAMINATIONS

SCH 303: Natural Products Chemistry

ANSWER ALL QUESTIONS IN SECTION A AND ANY TWO QUESTIONS IN SECTION B

SECTION A (30 MARKS): ANSWER ALL QUESTIONS

QUESTION 1(30 MARKS)

a) Differentiate using examples between secondary and primary metabolites (4 marks)
b) State five pharmacological uses of flavonoids (5 marks)
c) Name four common tested and approved phytopharmaceuticals (4 marks)
d) Limonene is among the simplest possible isoprenoid, draw and describe its structural features (4 marks)
e) With four alkaloid examples define the term psychoactive drugs (8 marks)
f) Illustrate the Diel-Ader cycloaddtion reaction mechanism (5 marks)

SECTION B (40 MARKS):
ANSWER ANY TWO QUESTIONS FROM THIS SECTION
EACH QUESTION CARRIES 20 MARKS

QUESTION 2 (20 marks)

a) Explain the term phytochemistry (2 marks)
b) Give the structures and names of three phytochemicals which have been isolated from *Artemisia annua* (6 marks)
c) Illustrate using a scheme the biosynthesis of the flavan nucleus (6 marks)
d) Name three carotenoids produced by human beings (3 marks)
e) Define the term mutarotaton (3 marks)

QUESTION 3 (20 marks)

a) Give the three classified categories of amino acids (3 marks)
b) Flavonoids are referred to as “Bioactive polyphenols”, explain (4 marks)
c) Draw the basic structural unit of flavonoids and give the correct numbering of atoms present (4 marks)
d) Discuss the biosynthesis of alkaloids (9 marks)

QUESTION 4 (20 marks)

a) With examples give four classes of alkaloids based on the chemical structural forms (8 marks)

b) Sesterpenes are derived from geranylfarnesol pyrophosphate: state the number of isoprene units and carbon atoms that they are composed of. In addition name two examples of sesterpenes. (4 marks)

c) Draw and name the chemical structures of four different types of flavonoids (8 marks)

QUESTION 5 (20 marks)

A. With the aid of a schematic diagram, outline the process of chromatographic separation of natural products from plants (6 marks)

B. Name the phytochemicals found in *Gingko biloba* and their therapeutic uses (4 marks)
Briefly discuss the biosynthesis of quinones (6 marks)

C. Name four phytochemicals with antiviral activity (4 marks)

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