

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE  
OF BACHELOR OF SCIENCE IN BIOMEDICAL SCIENCE AND  
TECHNOLOGY

**BIOC 311: PHYTOCHEMISTRY**

**STREAMS: BSC (BIOCHEM)Y3S1**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 05/12/2017**

**11.30 A.M. – 1.30 P.M.**

**INSTRUCTIONS:**

- ANSWER QUESTION ONE AND ANY TWO QUESTIONS
- DO NOT WRITE ON THE QUESTION PAPER

**QUESTION ONE (30 MARKS)**

- (a) Differentiate between primary and secondary metabolites. [4 marks]
- (b) Briefly describe the various features of secondary metabolites. [5 marks]
- (c) List and explain the uses of secondary metabolites by human beings. [5 marks]
- (d) Clearly explain the various types of primary metabolism. [5 marks]
- (e) Using examples, describe the industrial applications of the following compounds:
- (i) Isoflavonoids [1 mark]
  - (ii) Phyloquinones [1 mark]
  - (iii) Flavonoids [1 mark]
  - (iv) Coumarins [1 mark]
- (f) Write some short notes on monoterpenes. [3 marks]
- (g) Differentiate between tocopherols and phylloquinones. [4 marks]

**QUESTION TWO (20 MARKS)**

- (a) Using suitable illustrations, describe the various building blocks in secondary metabolites. [10 marks]
- (b) With the use of a diagram, illustrate the formation of gallic acid through the shikimate pathway, and state its significance. [6 marks]

## BIOC 311

- (c) What is the chemical structure of glyphosate? State the significance or applications of glyphosates. [4 marks]

### QUESTION THREE (20 MARKS)

- (a) With examples, discuss the clinical significance of purine alkaloids. [4 marks]

- (b) State and explain the practical applications of the following sesquiterpenes in life. [6 marks]

- (i) Artemisinin
- (ii) Parthenolide
- (iii) Alpha-Santonin

- (c) Differentiate between pyrrolidine, piperidine and indoles. [6 marks]

- (d) List the most common molecules used in the biosynthesis of secondary metabolites. [4 marks]

### QUESTION FOUR (20 MARKS)

- (a) (i) Fusidic acid is a phytosterol produced by the fungus *Acremonium fusidoides*. Explain the advantages of this steroid. [3 marks]

- (ii) What side effects are associated with alkaloids derived from nicotinic acid [7 marks]

- (b) For the following steroids, state their sources and mode of action. [10 marks]

- (i) Steroidal saponins
  - (ii) Cardiac glycosides
-