

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATION  
RESIT/SUPPLEMENTARY / SPECIAL EXAMINATIONS  
EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN  
BIOCHEMISTRY**

**BIOC 312: PHYTOCHEMISTRY**

**STREAMS:**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 10/08/2021**

**8.30 A.M - 10.30 P.M.**

**INSTRUCTIONS**

- Answer question **ONE (COMPULSORY)** and any other **TWO** questions.
- Sketch diagrams may be used whenever they may help to illustrate your answer.
- Do not write anything on the question paper.
- This is a closed book exam. **No** reference materials are allowed in the examination room.
- There will be **No** use of mobile phones or any other unauthorized materials.

**1. QUESTION ONE (30 MARKS)**

- a. With a use of a suitable diagram, demonstrate the acetate/mevalonate pathway involved in the formation of isopentenyl pyrophosphate, the basic 5 carbon unit of terpenoids biosynthesis. (8 marks)
- b. Discuss different classes of alkaloids according to the heterocyclic ring system they contain. (8 marks)
- c. With a use of suitable diagram, demonstrate the generic structures of major flavonoids. (8 marks)

- d. Some of the common phenolic compounds are phenols, phenolic acids and flavonoids. Draw their structures to demonstrate the difference between these secondary metabolites found in plants. (6 marks)

**2. QUESTION TWO (20 MARKS)**

- a. With a use of a suitable and well labeled diagram, illustrate the anthocyanin biosynthetic pathway in plants. (10 marks)
- b. Using a suitable diagram, illustrate how various secondary metabolites in plants can be derived from the primary metabolite. (10 marks)

**3. QUESTION THREE (20 MARKS)**

- a. With a use of a suitable diagram, demonstrate the biosynthesis of purine alkaloids theobromine and caffeine. (10 marks)
- b. Discuss the classification of terpenes according to the number of isoprene units. (10 marks)

**4. QUESTION FOUR (20 MARKS)**

- a. With the use of clear diagram, demonstrate the biosynthesis of isopentenyl pyrophosphate (IPP) and dimethylallyl pyrophosphate (DMAPP) in higher plants cells. (8 marks)
- b. Demonstrate using a suitable diagram, the biochemical metabolism of phenylpropanoids products in plants. (8 marks)
- c. Discuss the difference between the primary and secondary plant metabolites. (4 marks)
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