CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE (BIOCHEMISTRY)

BIOC 312: PHYTOCHEMISTRY

STREAMS: **TIME: 2 HOURS**

DAY/DATE: THURSDAY 13/12/2018 **2.30 P.M – 4.30 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.
- Write your answers legibly and use your time wisely.

QUESTION ONE (compulsory) (30 marks)

1. You are working as a research scientist in a Phytochemistry and Pharmacognosy laboratory in highly reputable research institute that produces the active pharmaceutical ingredients (API) products from the medicinal plant.

   a. Discuss some of the properties that you would consider when selecting a good solvent in plant extraction for bioactive component for drug manufacturing (4 marks).

   b. Explain some of the factors that may affects your choice of solvent to use in the process of plant extraction (6 marks).

   c. Explain some of the solvents that you can use in your extraction procedure (4 marks)

   d. Identify some of the factors that you would consider when determining the extraction methods (6 marks).

2. Flavonoids are common category of plant secondary metabolites that are used widely in management of diarrhoea

   a. With a suitable example, illustrate the common generic structures of the major flavonoids (6 marks).

   b. Discuss the mechanism of action of flavonoids in the management of diarrhoea (4 marks).

Question two (20 marks)

1. State the isoprene rule. (2 marks).

2. With use of a suitable example and diagram, illustrate an irregular terpene. (5 marks)

3. Discuss Dragendroff's test and its application in phytochemical screening. (5 marks)
   .

4. Caffeine in an example of purine alkaloid common used as an analgesic. With use of a suitable diagram, illustrate the biosynthesis of above named purine alkaloids. (8 marks)

Question three (20 marks)

1. With use of a suitable diagram, Illustrate how isoprenes can condense to form a terpene. (6 marks).

2. Discuss some of the pharmacological properties of salicins and salicylates extracted from medicinal plants. (6 marks).

3. Describe the 3 common effects of tropane alkaloids within the body. (3 marks).

4. (a). State the plant that morphine come from? (1 marks).

   (b). What are some of the pharmacological activities of morphine in the body? (4 marks)

Question four (20 marks).

1. Briefly describe how maceration is used in plant phytochemical extraction. (4 marks).
2. With a use of a diagram illustrate the structure of coumarins and briefly explain its mechanism of action in management of viral infection. (8 marks).
3. With a use of a suitable diagram, illustrate the melavonic acid pathway as applied in the biosynthesis of terpenoids. (8 marks).
