CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF
DOCTOR OF PHILOSOPHY IN ENVIRONMENTAL SCIENCE

ENSC 911: ECOSYSTEM HELATH MODELLING

STREAMS: PHD (ENSC) YISI   **TIME: 3 HOURS**

DAY/DATE: WEDNESDAY 22/04/2020   **2.30 PM – 5.30 PM**

INSTRUCTIONS:

- **Answer ALL Questions in Section A and any other Two Questions in Section B**
- **Do not write anything on the question paper**

SECTION A (20 MARKS)

1. Briefly discuss the role of modelling in ecology. [4 marks]

2. Give an overview of key biodiversity areas, natural world heritage sites, and protected areas in Kenya. [6 marks]

3. Briefly discuss the key factors that inform the selection of appropriate tools for ecosystem health assessment. [6 marks]

4. Explain why and how ecosystem health models can be tested for validity. [4 marks]

SECTION B (40 MARKS)

5. (a) Ecosystems get degraded mainly due to human activities. Discuss [10 marks]

   (b) Discuss the principles that may be used for the selection of key indicators for evaluating ecosystem health. [10 marks]

6. (a) Using illustrations, discuss the decision trees for the selection of ecosystem service assessment tools based on the aim of the assessment and required outputs.
   [10 marks]

(b)   You are an ecosystem modeler tasked to develop a soil inventory for the upper Eastern region of Kenya through prediction of soil properties. Explain how you undertake the exercise.   [10 marks]

7.   (a)   Discuss the role of carbon sequestration models in planning and management of forest ecosystems.   [10 marks]

(b)   Both local people and scientists hold ecological knowledge due to prolonged contact with the environment and from systematic inquiry based on scientific methods respectively. However, the integration of both knowledge types into ecological models raises methodological challenges. Discuss.   [10 marks]