



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF ENVIRONMENTAL SCIENCES

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF ENVIRONMENTAL SCIENCE

ENS 432: ENVIRONMENTAL MODELLING

DATE: 13/8/2021

TIME: 2.00-4.00 PM

INSTRUCTIONS:

Answer question ONE and any other TWO questions

QUESTION ONE (30 MARKS)

- a) Citing relevant examples, compare the following types of models used in environmental modelling
- i. Physical models vs. Empirical models (4 marks)
 - ii. Deterministic models vs. Probabilistic models (4 marks)
 - iii. Static models vs. Dynamic models (4 marks)
 - iv. Distributed models vs. Lumped models (4 marks)
 - v. Analytical models vs. Numerical models (4 marks)
- b) Using appropriate examples, explain the main goals and objectives of environmental modelling (10 marks)

QUESTION TWO (20 MARKS)

- a) Citing relevant examples, describe material transfers in environmental modeling (4 marks)
- b) Discuss the pitfalls that may influence the development and application of models in assessment of water quality in a water body (16 marks)

QUESTION THREE (20 MARKS)

- a) Citing relevant examples explain the iterative steps you would adopt in development and application of models for natural resources management (10 marks)
- b) Using appropriate examples explain the steps you would adopt in integration of existing models to predict climate change impacts on water resources in Kenya (10 marks)

QUESTION FOUR (20 MARKS)

Discuss the key issues you would consider in development of a decision support system for management of the Mara ecosystem

QUESTION FIVE (20 MARKS)

Using suitable examples, discuss the modeling approaches you would adopt for Forest Ecosystem Management