



# MACHAKOS UNIVERSITY

University Examinations for 2018/2019 Academic Year

SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF ENVIRONMENTAL SCIENCES

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF ENVIRONMENTAL SCIENCE

ECD 205: PRINCIPLES OF INTEGRATED WATERSHED MANAGEMENT

DATE: 25/7/2019

TIME: 2.00-4.00 PM

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## INSTRUCTIONS:

Answer question ONE and any other TWO questions

### QUESTION ONE (30 MARKS)

- a) Explain the following concepts
- i. Watershed (2 marks)
  - ii. Integrated watershed management (2 marks)
  - iii. Geographic Information System (2 marks)
  - iv. Physical models (2 marks)
  - v. Lumped hydrological Models (2 marks)
- b) Using the Athi river basin as an example, explain the key elements you would consider in designing a holistic management approach for the basin (20 marks)

### QUESTION TWO (20 MARKS)

Discuss the main challenges in the planning and implementation of the integrated watershed management approach in Kenya

**QUESTION THREE (20 MARKS)**

Watershed modeling is one of the approaches used in the characterization of watershed. Discuss the key steps in watershed modeling process

**QUESTION FOUR (20 MARKS)**

- a) Citing relevant examples, explain the steps necessary in developing data Quality Objectives for watershed monitoring (14 marks)
- b) Using appropriate examples discuss types of data gaps that collection of additional information during watershed planning and management (6 marks)

**QUESTION FIVE (20 MARKS)**

Discuss the watershed planning process and the different indicators that can be used in the process