



**MACHAKOS UNIVERSITY**  
University Supplementary Examinations for 2021/2022 Academic Year  
**SCHOOL OF ENVIRONMENT AND NATURAL RESOURCE MANAGEMENT**  
**DEPARTMENT OF ENVIRONMENTAL SCIENCES**  
**THIRD YEAR SUPPLEMENTARY EXAMINATION FOR THE DEGREE OF**  
**BACHELOR OF ENVIRONMENTAL SCIENCE**

**ENS 306: GEOINFORMATICS**

**Date:**

**Time:**

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**Instructions: Answer question ONE and any other TWO questions**

**QUESTION ONE (30 Marks)**

- a) Explain the following concepts
- i. Geographic Information System (2 marks)
  - ii. Remote sensing (2 marks)
  - iii. Spatial data (2 marks)
  - iv. Topology (2 marks)
  - v. Metadata (2 marks)
- b) Explain the key components in development of a Geographic Information System for natural resources management (10 marks)
- c) Explain the analytical functions used in spatial data analysis in a GIS (10 marks)

**QUESTION TWO (20 Marks)**

- a) Explain the key advantages of Geographic Information System as a tool for natural resources management (10 marks)
- b) Explain the key steps you would adopt in developing a computer-based spatial database management system (DBMS) for natural resources management in your county (10 marks)

**QUESTION THREE (20 Marks)**

- a) Using suitable examples, discuss the spatial data management and analysis procedures necessary in GIS (10 marks)
- b) Discuss the key challenges in the development and implementation of Geographic Information System in your county (10 marks)

**QUESTION FOUR (20 Marks)**

Using appropriate examples, discuss the concept of spatial data generalization as used in GIS

**QUESTION FIVE (20 Marks)**

Using suitable examples, discuss spatial data symbolization as used in the visualization of spatial data in GIS