



**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)**

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS  
2019/2020 ACADEMIC YEAR**

**FIFTH YEAR SECOND SEMESTER EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF SCIENCE IN CIVIL AND STRUCTURAL  
ENGINEERING**

**COURSE CODE: CSE 542**

**COURSE TITLE: GIS AND REMOTE SENSING**

**DATE: TUESDAY 27<sup>TH</sup> OCTOBER 2020 TIME: 8.00 – 10.00 AM**

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**INSTRUCTIONS:**

1. This paper contains **FOUR** questions
2. Answer any **THREE** questions
3. Marks for each question are indicated in the parenthesis.
4. Examination duration is **2 Hours**

MMUST observes **ZERO** tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

**QUESTION 1 (25 Marks)**

- (a) Distinguish between the following terms as used in remote sensing
- i) electromagnetic radiation and electromagnetic energy
  - ii) image processing and image Analysis
  - iii) airborne and spaceborne sensor platforms
  - iv) passive and active sensors
  - v) polar orbits and geostationary orbits (10 Marks)
- (b) What is a geostationary satellite and what is the purpose of such satellites (3 Marks)
- (c) Why do we often use false-color composite images in remote sensing? Give an example stating the bands needed to achieve such an image (3 Marks)
- (d) As with all measurement techniques, satellite imagery is susceptible to errors and other problems requiring analysis. Explain Why? (7 Marks)
- (e) Distinguish between Microwave remote sensing and optical remote sensing (2 Marks)

**QUESTION 2 (25 Marks)**

- (a) Explain the role remote sensing could play in the proposed establishment of an irrigation scheme (9 Marks)
- (b) With regard to satellite remote sensing differentiate between the following characteristics of remote sensing instruments
- (i) Temporal resolution
  - (ii) Spatial resolution
  - (iii) Spectral resolution
  - (iv) Radiometric resolution (12 Marks)
- (c) Spectral responses from identical ground surface features may vary because several factors. State at least five (4 Marks)

**QUESTION 3 (25 Marks)**

- (a) Describe how raster and vector approaches are used to construct point, line and area entities for processing in the computer (6 marks)
- (b) Briefly explain the differences between the following methods of digital data capture?
- (i) Scanning
  - (ii) Digitizing
  - (iii) On-screen digitizing
  - (iv) Vectorization
- Hence or otherwise state the advantages of manual digitizing. (9 marks)

- (c) In digital mapping, there are various data sources used depending on various factors. Highlight the merits and demerits of using the following data sources in digital mapping. (10 Marks)
- (i) Ground survey data
  - (ii) Aerial photographs
  - (iii) Satellite Imagery
  - (iv) Existing reports
  - (v) Hard copy maps

**QUESTION 4 (25 Marks)**

- (a) What are topological relationships and why are they important in GIS analysis (5 Marks)
- (b) The implementation of GIS in any organization may be seen as a six-phase process. Discuss these phases: (12 Marks)
- (c) Suppose that you have a GIS database for a neighbourhood which has more than one highway. The database contains the following feature classes:
- Parcels with their attributes like “parcel number”, “area”, “owner” etc.
  - Roads with their attributes like “name”, “length”, “type” e.g. highway, street.
- Describe the workflow (step by step) to find all parcels within a distance of 2 km to “Balози” Highway that are larger than 500 m<sup>2</sup>. (9 Marks)