



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

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

**FIFTH YEAR SECOND SEMESTER SUPPLIMENTARY
EXAMINATIONS**

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

COURSE CODE: CSE 542

COURSE TITLE: GIS AND REMOTE SENSING

DATE: FRIDAY 29TH JANUARY 2021 TIME: 11.00 AM-1.00PM

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 5 Printed Pages. Please Turn Over.

QUESTION 1 (25 Marks)

- (a) Differentiate between the following terms as used in remote sensing
- (i) a normal color photograph and false color photograph
 - (ii) geostationary orbits and sun-synchronous satellite orbits
 - (iii) ascending and descending passes
 - (iv) across track and along track scanning (13 marks)
- (b) In order to create a colour composite image, we select 3 bands from a multispectral scene and display one band in red, the second in green and the third in blue. If you wanted to display a Landsat ETM image, which ETM band numbers would you assign to each colour to create:
- (a) a true colour composite; and (b) a standard false colour composite? (6 Marks)
- (c) Explain, with the aid of a diagram, how a linear contrast stretch changes the distribution of pixel values in a histogram (6 Marks)

QUESTION 2 (25 Marks)

- (a) 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)
- (b) Spectral responses from identical ground surface features may vary because several factors. State at least five (5 Marks)
- (c) Explain the difference between Multispectral and Hyperspectral Remote sensing (6 marks)
- (d) What is digital image processing? (2 Marks)

QUESTION 3 (25 Marks)

- (a) Outline the key stages of digital image processing
(8 marks)
- (b) Edge-enhanced images attempt to preserve both local contrast and low frequency brightness information. They are produced by “**adding back**” all or a portion of the grey values in an original image. Clearly explain the three steps involved in this process.
(7 Marks)
- (b) What are topological relationships and why are they important in GIS analysis
(5 Marks)
- c) State the errors that one can easily be overcome by creating topological relationships
(5 Marks)

QUESTION 4 (25 Marks)

- (a) 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 and disadvantages of manual digitizing.
(13 marks)
- b) Discuss the utility of digital image processing applications
(6 Marks)
- c) Outline a simple change detection procedure using image subtraction transformation stating its relevant application
(6 marks)