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(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITRY EXAMINATIONS 2021/2022 ACADEMIC YEAR

FIFTH YEAR SECOND SEMESTER SUPPLEMENTARY EXAMINATIONS

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

COURSE CODE: CSE 542

COURSE TITLE: GIS AND REMOTE SENSING

DATE: 6/10/2022 **TIME:** 9.00 AM-10.00AM

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)Orbit and Swath
(iv)across track and along track scanning. (16 Marks)

(b) As with all measurement techniques, satellite imagery is susceptible to errors and other problems requiring analysis. Explain Why?
(7 Marks)

(c) How are colour composite images created?
(2 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 for several reasons. State atleast five of them
(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) In image analysis differentiate between the following
(i) Supervised classification
(ii) Unsupervised classification
(iii) Image rectification
(iv) Image enhancement (12 Marks)

(b) Explain, with the aid of a diagram, how a linear contrast stretch changes the distribution of pixel values in a histogram

(6 Marks)

(c) 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)

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) 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 "Balozi" Highway that are larger than 500 m^2.

(12 Marks)