



MAASAI MARA UNIVERSITY

**REGULAR UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR
SECOND YEAR FIRST SEMESTER**

**SCHOOL OF NATURAL RESOURCE, TOURISM
AND HOSPITALITY**

**MASTER OF ENVIRONMENTAL PLANNING AND
MANAGEMENT**

COURSE CODE: EPM 8207 E

COURSE TITLE: REMOTE SENSING AND GIS

DATE: 1ST APRIL, 2022

TIME: 11:00 - 13:0 HOURS

INSTRUCTIONS TO CANDIDATES

Answer **ALL** questions in section **A** and any other **THREE** in section **B**.

This paper consists of 4 printed pages. Please turn over

SECTION A – 25 MARKS – ANSWER ALL THE QUESTIONS

1. If you are asked to perform a classification of Landsat Thematic Mapper imagery over an area, under which circumstances would you consider an unsupervised classification over a supervised classification
(5 marks)
2. Discuss the need for GIS data integration in environmental planning and management
(5 marks)
3. Land use and land cover mapping can directly benefit from the high level of detail provided by hyperspectral data. Elaborate this statement in the context of hyperspectral remote sensing
(5 marks)
4. Clarify whether there are any benefits of using RADAR remote sensing for urban infrastructural projects over optical remote sensing
(5 marks)
5. Explain biophysical modelling in remote sensing and describe any two physical variables that can be modelled using remote sensing and how
(5 marks)

SECTION B – 45 MARKS - ANSWER ANY THREE QUESTIONS

6. As a resource manager, explore the opportunities and challenges of using remote sensing data to address efficient management of resources in both the developed and developing countries of the world.
(15 marks)
7. Discuss the current use of GIS in your area of interest or related fields and identify potential for furthering research. Generate a research question and describe a study proposal to solve a particular problem in the area you have chosen.
(15 marks)
8. Remotely sensed multispectral scanner imagery and aerial color and color infrared photography of an area were taken for vegetation mapping. The multispectral scanner data were processed digitally while the color and color infrared photography were manually photo-interpreted to characterize vegetation.
 - a. Explain any three standard digital image enhancement techniques that would have been applied to the multispectral scanner data to assist in image interpretation
(6 marks)

- b. Explain any two elements of image interpretation (with respect to vegetation mapping) that would have been used to interpret the color and color infrared photography **(4 marks)**
- c. Give advantages of each method of interpretation **(5 marks)**
9. (a) Briefly explain the conceptual basis of the linear contrast stretch. Explain the term "Histogram Equalization". Elaborate the contrast stretch enhancement. **(10 marks)**
- (b) Image pre-processing, enhancement and visualization are critical processes in deriving information from remotely sensed imagery, discuss. **(5 marks)**
10. Principal Components Analysis (PCA) is often used as an image processing method in remote sensing image analysis
- (a) Given images A, B, C showing PC1, PC2 and PC6 in which the PCA technique has been applied to a Landsat image of Narok, indicate which of the images (A, B, C) is the PC1 image, the PC2 image and the PC6 image. Explain your answer **(3 marks)**



Image A - Question 5 (a)

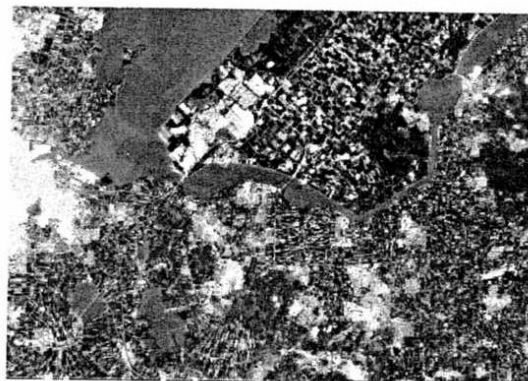


Image B - Question 5 (a)



Image C - Question 5 (a)

- (b) Give two (2) reasons why a researcher would like to perform a principal component transform of a remotely sensed image **(4 marks)**
- (c) Describe the importance of image classification in Remote Sensing. Explain briefly the categories of image classifications used and distinguished among each other **(8 marks)**

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