



GWANDA STATE UNIVERSITY

FACULTY OF ENGINEERING AND ENVIRONMENT

DEPARTMENT OF GEOMATICS AND SURVEYING

INTRODUCTION OF DIGITAL MAPPING AND REMOTE SENSING

EGS3101

Final Examination Paper

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: Mr. T. Mathe

INSTRUCTIONS

Read all questions carefully

Answer ALL questions

The number of marks allocated to each question is indicated in bold.

QUESTION 1**5**

Write brief statements about each of the following:

- a. Colour composite image. (1)
- b. Definition of Remote Sensing. (1)
- c. Definition of a Sensor (1)
- d. The relationship between wavelength and energy content. (1)
- e. Definition of an Atmospheric Window. (1)

QUESTION 2**6**

What are the main differences between Supervised and Unsupervised classification?

QUESTION 3**6**

- a) What is an image histogram? (2)
- b) Using Figure 1, identify which of the following histograms represents the characteristics listed below;
 - i. Low Contrast Image (1)
 - ii. High Contrast Image (1)
 - iii. Bright Image (1)
 - iv. Dark Image (1)

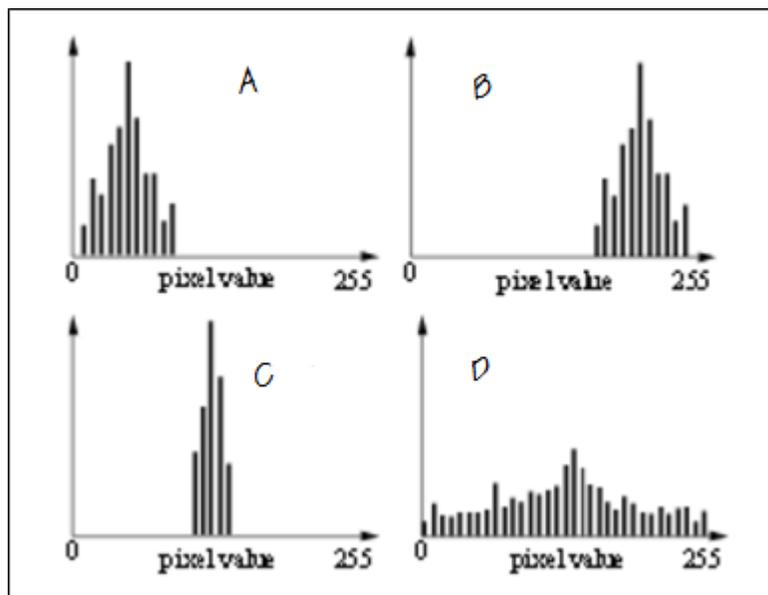


Figure 1

QUESTION 4**6**

- a) What is a Normalized Difference Index? (4)
- b) Write down the formula for computing the Normalized Difference Index using Landsat TM bands. (2)

QUESTION 5 **10**

Discuss how the reduction of incoming solar radiation at longer wavelengths affects the design of bandwidth and spatial resolution for middle infrared and thermal infrared sensors.

QUESTION 6 **8**

Give a brief description of spatial, spectral, radiometric and temporal resolution.

QUESTION 7 **10**

Describe image processing, stating its relevance to the remote sensing process.

QUESTION 8 **10**

- a) Discuss scattering and absorption of electromagnetic radiation by the earth's atmosphere. (6)
- b) Briefly discuss the effect of each of the processes in 8(a) has on satellite sensor-band design. (4)

QUESTION 9 **10**

Describe five applications where Remote Sensing is used.

QUESTION 10 **14**

Describe the seven elements that can assist one in visual interpretation of remote sensing images.

QUESTION 11 **15**

Briefly explain the main steps involved in the geometric correction of a remotely sensed image.

END OF EXAMINATION