THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF CIVIL ENGINEERING
Diploma in Technology (Civil Engineering)

Final Examination - 2005/2006

CEX4237 - Remote Sensing & Introduction to GIS

Time Allowed : Three Hours

Date: 22nd April 2006 Time : 0930-1230 hrs.

Paper consists of 3 sections A, B and C

Answer ONLY 5 questions selecting at least one question from each section.

Section A

Q1.

(i) Compare and comment on the 'information contained in an image' when you sense an object with your eye and if you use a camera/a sensor on a satellite to sense an object. Explain the difference between the 'Analogue format' and the 'Digital format' of recording information in an image.

(06 marks)

(ii) Explain the major differences between Optical, Thermal and Radar sensing. List out and briefly identify the reasons why interpretation of radar images is complex.

(06 marks)

(iii) Briefly explain the basic feature characteristics used in identification of features in 'Analogue' interpretation of satellite images giving suitable examples.

(08 marks)

Q2.

(i) Explain 'Spectral Signature' and the significance of this in identifying image features. How can you explain the 'variability' of spectral signature?

(08 marks)

(ii) Outline the method of performing 'supervised classification' and 'unsupervised classification' on satellite images using software for image interpretation.

(06 marks)

(iii) Explain the different types of 'resolutions' and their significance in the interpretation of satellite images.

(06 marks)

Q3.

(i) What is multispectral sensing? Explain the use of 'hyperspectral' images in detailed analysis.

(05 marks)

(ii) List and briefly explain five important applications of 'thermal scanner imagery'.

(05 marks)

(iii) Using clear diagrams explain how the 'side looking airborne radar system', SLAR, works when taking an image.

(05 marks)

(iv) Describe 'Linear Contrast Enhancement' of digital images.

(05 marks)

Section B

Q4.

i.) Enumerate utility of a Global Positioning System for various human endeavours. (05 marks)

ii.) Describe two commonly used Global Coordinate Systems for navigation and positioning. (05 marks)

iii.) Define a 'Geodetic Datum' and describe the evolution of such datums. (05 marks)

iv.) What is a 'Geoid Model'? (05 marks)

Q5.

i.) Describe the technical theory behind the functioning of NAVSTAR GPS system. (05 marks)

ii.) Discuss general and special features of NAVSTAR GPS constellation. (05 marks)

iii.) Discuss L1 and L2 carrier signals used by GPS satellites. (05 marks)

iv.) Describe the technique known as Differential GPS (DGPS) (05 marks)

Section C

Q6.

(i) Explain the essential functions of a Geographical Information System (GIS) and compare with past methods of maintaining such information. (05 marks)

(ii) What are the five generic questions that a (GIS) can answer? (05 marks)

(iii) Explain the significance of these questions on a GIS, in relation to 'planning & maintenance' of a reliable pipe borne water supply system for Sri Lanka. (10 marks)

Q7.

(i) Explain 'what is geographic data' and the 'formats' in which spatial feature data can be stored. (05 marks)

(ii) Discuss the different methods of 'data output' and 'data presentation' on a GIS. (05 marks)

(iii) Describe the spatial analysis functions of a Geographical Information System. (10 marks)