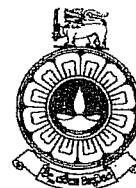


**THE OPEN UNIVERSITY OF SRI LANKA**  
**DEPARTMENT OF CIVIL ENGINEERING**  
**Diploma in Technology (Civil Engineering)**



**Final Examination - 2005/2006**

**CEX4237 - Remote Sensing & Introduction to GIS**

**Time Allowed : Three Hours**

**Date: 22<sup>nd</sup> 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)