December 2008 Technical National Exams

Geom-A5 Remote Sensing and Image Analysis

(3 hours duration)

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.

2. This is a ClOSED BOOK EXAM. Any Sharp or Casio approved calculators are permitted.

3. FIVE (5) questions constitute a complete exam paper. The first five questions as they appear in the answer book will be marked.

4. Each question is of equal value.

04-Geom-A5 Remote Sensing and Image Analysis

Candidate ID:_____ Name:_____ Signature:_____

Give answers to any five (5) of the following seven questions [100% total, 20 marks each].

1. Define nearest neighbor, bilinear, and cubic convolution resampling techniques? What are their advantages and disadvantages when applying them to intensity interpolation process for geometric correction of remote sensing imagery?

2. Define the terms of special, spatial, temporal, and radiometric resolution. Using Landsat-7 ETM+ and IKONOS image data to compare their characteristics in terms of those resolutions.

3. Given the following error matrix of the classification map derived from Landsat-7 ETM+ data, compute the producer's, the users, and the overall accuracy as well as Kappa coefficient of agreement.

		Reference data				
		Residential	Commercial	Wetland	Forest	Water
Classification results	Residential	70	5	0	13	0
	Commercial	3	55	0	0	0
	Wetland	0	0	99	0	0
	Forest	0	0	4	37	0
	Water	0	0	0	0	121

4. Describe the principle of the object-oriented classification method and explain its advantages over the pixel-based classification method in land use and land cover classification using commercial high-resolution multispectral satellite imagery.

5. Define the two conventional classifiers, Minimum Distance to Means and Maximum Likelihood. What are their advantages and disadvantages when applying them for supervised classification?

6. Given 1 m resolution panchromatic and 4 m resolution multispectral image data of IKONOS, explain how to generate a 1 m resolution natural colour composite through the pan-sharpening process using the IHS transform approach.

7. Give Landsat-7 ETM+ panchromatic and multispectral images, list six kinds of vegetation index.