ASSOCIATION OF CANADA LANDS SURVEYORS - BOARD OF EXAMINERS
WESTERN CANADIAN BOARD OF EXAMINERS FOR LAND SURVEYORS
ATLANTIC PROVINCES BOARD OF EXAMINERS FOR LAND SURVEYORS

SCHEDULE I / ITEM 4 **March 2004**
REMOTE SENSING & APPLIED PHOTOGRAMMETRY

Note: This examination consists of _10_ questions on _2_ pages. **Marks**

Q. No Time: 3 hours Value Earned

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1	Briefly explain the following terms: a) Spectral Reflectance b) Spatial resolution c) SLAR d) Image enhancement e) Radiometric calibration f) Normalization of hyperspectral imagery	2 1.5 1.5 1.5 1.5 2	
2	a) What is a high-pass filter used for? b) What is a principal component analysis (PCA) used for? c) Explain the main differences between the TM sensor on the LANDSAT and the HRV sensor onboard the SPOT satellite.	3 3 4	
3	a) What are the major steps for the thematic classification of satellite imagery? b) What is the meaning of *training the classifier*? c) What are the major differences between *supervised and unsupervised training of the classifiers*? d) what is the main difference between parametric and nonparametric thematic classification of remote sensing data?	4 3 4 4	
4	a) Briefly explain the following terms: • Registration • Rectification • Geocoding • Orthorectification b) Briefly describe the necessary steps and needed information for rectifying a SPOT image?	5 5	
5	What are the uses of: a) Spectral band ratios b) The tassled-cap transform	2.5 2.5	
6	The ground distance of a straight boundary of a cornfield is 550 m. The field is nearly level and lies beside the principal point of the photo. The distance on the photo of this boundary is 5.15 cm. a) What is the scale of the photograph? b) Express this scale in unit equivalents in centimeter per kilometer. c) If the focal length of the camera used to take the photograph is 152 mm, how high was the aircraft above the ground when taking the photograph?	3 3 4	

7	What are the theoretical minimum numbers and types of control points required for the absolute orientation of aerial stereopairs? Explain your answer. What considerations are relevant to the placement of these control points? Use diagrams to illustrate your answer?	10	
8	What are the main differences between the 2-D affine and 2-D similarity transformations in terms of transformation parameters, quantities needed to estimate these parameters? Tabulate your answer and clearly indicate any assumptions.	10	
9	The airbase of a stereo-pair of vertical photos is 1000 m, and the flying height above average ground is 2000 m. The camera has a focal length of 152.5 mm and a 23-cm format. a) What is the percent over lap? b) If the aircraft has a ground speed of 250 km/hr, what is the time between exposures along the flight line? c) Assume that the spacing between adjacent flight strips is 2400 m. What is the percent side lap?	3 4 3	
10	a) What is the main goal of aerial-triangulation? Briefly describe the principle of analytical aerial-triangulation using the Bundle method (i.e. what are the mathematics being used, known and unknown quantities, etc.) b) Briefly describe the benefits of the Global Positioning System (GPS) to aerial-triangulation.	6 4	
	Total Marks:	100	