

**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
REMOTE SENSING & APPLIED PHOTOGRAMMETRY**

March 2005

Note: This examination consists of 10 questions on 2 pages.

<u>Q. No</u>	<u>Time: 3 hours</u>	<u>Marks</u>	
		<u>Value</u>	<u>Earned</u>
1	Briefly explain the following terms:		
	a) False Color Image	2	
	b) Spectral, spatial and temporal resolution	2	
	c) SLAR	2	
	d) Image enhancement	2	
	e) Geometric correction of satellite images	2	
2	f) Normalization of hyperspectral imagery	2	
	a) List types of information that Microwave sensors are able to provide about the land and oceans that optical sensors cannot.	5	
	b) What is a high-pass filter used for?	3	
3	c) What is a principal component analysis (PCA) used for?	3	
	Classification is one of the most widely used analysis techniques in remote sensing.		
	a) What are the major differences between supervised, unsupervised, and hybrid classification techniques?	4	
4	b) List the major steps for supervised classification of a satellite imagery.	4	
	d) What is the main difference between parametric and nonparametric thematic classification of remote sensing data?	4	
	a) Briefly explain the following terms:		
5	<ul style="list-style-type: none"> • Registration • Rectification • Geocoding • Orthorectification 	5	
	b) Briefly describe the necessary steps and needed information for rectifying a SPOT image.	5	
5	What are the uses of:		
	a) Spectral band ratios?	2.5	
	b) The tassled-cap transform?	2.5	
6	Briefly explain the following terms:		
	a) Principal point	2	
	b) Base-height ratio	2	
	c) Exterior orientation parameters	2	
	d) Relative orientation parameters	2	
	e) Collinearity condition	2	
	f) Coplanarity condition	2	

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.	8	
8	The average elevation of a vertical photograph is 500 m above mean sea level and its scale is 1 mm = 15 m. How high above mean sea level was the aircraft flying when taking the photograph with a 150-mm focal length camera?	6	
9	A tower was identified on a "perfectly" vertical photograph and the distance between its top and its bottom was measured to be 14.3 mm and the distance from the photo center to the top of the tower was measured to be 85.6 mm. If the scale of the photograph is 1:120,000 and the focal length used to take this photograph is 152.4 mm, how tall is the tower?	8	
10	<p>a) 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.)</p> <p>b) Briefly describe the benefits of the Global Positioning System (GPS) to aerial triangulation.</p> <p>c) Briefly describe the principle of direct georeferencing using integrated GPS and Inertial Navigation Systems.</p>	6 4 6	
	Total Marks:	100	