

**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
APPLIED PHOTOGRAMMETRY and REMOTE SENSING**

**February 2000
(1990 Regulations)
(Closed Book)**

This examination consists of **11** questions on **2** pages

Time: 3 hours

Marks

Applied Photogrammetry

1.	Briefly explain the following terms: <ul style="list-style-type: none">• Principal point• Base-height ratio• Collinearity condition• Coplanarity condition	10
2.	How many 1:10,000 aerial photographs would be required to provide complete stereo coverage of a rectangular project area 8 kilometers long by 12 kilometer wide? For this project, you are using a standard aerial camera with a focal length of 152.00 mm and a 230 by 230 mm format. The forward overlap is specified as 60% and the sidelap is specified as 30%.	15
3.	Draw a sketch of a vertical photograph over a variable terrain and demonstrate the formula used to compute the scale at a point P whose elevation above the datum is h.	5
4.	a) What is the main goal of aerial-triangulation? Briefly describe one aerial-triangulation method. b) Briefly describe the benefits of the Global Positioning System (GPS) to aerial-triangulation.	15
5.	List the characteristics you would look for if you were going to buy a digital camera for geomatics-related work?	5

Remote Sensing

6.	<p>Briefly explain the following terms:</p> <ul style="list-style-type: none"> • Atmospheric window • Spectral Reflectance • Spatial resolution • SLAR • False-color composite • Image enhancement • Radiometric calibration 	10
7.	<p>Black bodies are idealized substances that emit at the maximum rate allowed by thermodynamic laws. Natural materials are not as efficient at converting internal energy to radiant EM energy.</p> <p>a) What equation is used to model the emitted radiation from a black body?</p> <p>b) Define the quantity used to describe the emission from natural materials</p>	10
8.	<p>What are the factors involved in remote sensing image acquisition that affect the image geometry?</p>	5
9.	<ul style="list-style-type: none"> • What is a low pass filter used for? • What is a principal component analysis (PCA) used for? • Explain the main differences between the TM sensor on the LANDSAT and the HRV sensor onboard the SPOT satellite. 	10
10.	<p>How can the normalized difference vegetation index (NDVI) be used to monitor the evolution of a growing crop from soil reflectance to vegetation reflectance?</p>	5
11.	<p>The following is a sample of a remote sensing image:</p> <pre> 7 7 10 5 7 6 4 4 5 </pre> <p>What is the smoothed value at the central point using the following filters:</p> <p>a) Mean</p> <p>b) Median</p> <p>c) The following smoothing mask</p> <pre> 1 1 1 1 2 1 1 1 1 </pre>	10

Total Marks: 100