

**CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS**

**E-4 ADVANCED REMOTE SENSING**

**March 2013**

**Note: The use of calculators or similar devices is not permitted in this exam.**

**Note: This examination consists of 10 questions on 1 page.**

**Marks**

**Q. No**

Time: 3 hours

Value   Earned

1.	Each wavelength range of the electromagnetic spectrum returns information about different characteristics of the reflecting object. For the visible-near infrared (VIR) range and for the microwave range, state the information received by reflected radiation and its potential uses.	10	
2.	Spatial resolution is generally referred to as “high” or “low.” These terms can however be very imprecise. State the essential problem in using this terminology, and propose a better way of expressing the spatial resolution of a remotely sensed image.	10	
3.	What is the difference between image orthorectification and simple geometric rectification? What data is needed for each?	10	
4.	Sketch spectral reflectance curves for your choice of four common earth-surface objects, in the visible-infrared region. Then, indicate the wavelength bands you would propose using for an orbiting passive sensor to provide maximum classification accuracy. Briefly explain your reasoning.	10	
5.	Answer <b>either a or b</b> :  a) Describe the principles of Radar Interferometry, and give an example of an application where this technology would be appropriate. Include a definition of coherence.  b) When using LiDAR data, explain what is meant by the terms “first return,” “last return” and “intensity.” Outline how LiDAR can be used in one common applications area of your choice (applications area examples: forestry, urban planning, etc.).	10	
6.	Describe the steps involved and the data needed to transform at-sensor radiance to object reflectance, such that the reflectance can be compared to ground-acquired reflectance measurements.	10	
7.	In a passive optical satellite sensor system, what is the physical reason why the images with the highest spatial resolution are panchromatic rather than multispectral?	10	
8.	Layover can be a problem when using both aerial photographs and satellite images. Define layover, state how it can be removed, and state the characteristics of images/photos where it is more likely to be a major problem.	10	
9.	Which is most important in interpreting geomorphological features – high spatial resolution, high temporal resolution or high spectral resolution? Justify your response.	10	
10.	What are the advantages and disadvantages of nearest neighbour, bilinear, and bi-cubic convolution resampling techniques?	10	
	<b>Total Marks:</b>	100	