

**CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS
ATLANTIC PROVINCES BOARD OF EXAMINERS FOR LAND SURVEYORS**

SCHEDULE I / ITEM 6

March 2008

MAP PROJECTIONS AND CARTOGRAPHY

Note: This examination consists of 8 questions on 2 pages.

Marks

<u>Q. No</u>	<u>Time: 3 hours</u>	<u>Value</u>	<u>Earned</u>
1	a) On a 1:50 000 Canadian National Topographic System (NTS) map, a distance of 2,500 m was measured along the central meridian, is this distance longer or shorter than the ellipsoidal distance? By how much?	4	
	b) How could I modify the map projection used for the 1:50 000 NTS maps to make it more precise when I measure a distance along the Central Meridian? What impact would it have on the precision of the measured distances elsewhere on the map?	4	
	c) Precisely speaking, is the scale a constant value in a 1:50,000 map? Explain.	4	
	d) What are the determining factors in selecting an appropriate map scale?	4	
2	The October 2007 magnetic azimuth of a portion of a gas transmission line has been determined to be $289^{\circ}08'$. At what geodetic azimuth should this line be plotted on a January 1996 Canadian topographic map that shows a grid magnetic declination of $21^{\circ}W$ increasing (moving westward) $4.5'$ per year and a convergence angle (grid to geodetic north) of $1^{\circ}45'$ (grid north is west of geodetic north)?	6	
3	Using well labelled sketches only, illustrate the Mercator and the Transverse Mercator projections in the Northern hemisphere; give one sketch for the Mercator projection and the other sketch for the Transverse Mercator projection. The sketches must show the projections of the Equator, Central Meridian, parallels and meridians with the appropriate relationship between the lines of the graticule clearly illustrated.	14	
4	Considering the shape and size of New Brunswick, what map projection would you recommend to the Province in order to achieve a minimum distortion on a map with a scale of 1:10,000? Explain your answer with regard to the expected distortion properties including suggested scale factor range, developable surface, aspect, suitable earth model (s), and type of contact (secant or tangent).	8	
5	What is offset lithography? Explain the steps involved in a single color offset lithographic reproduction of a map.	9	

6	a) What is map layout? Why is it important?	3	
	b) Explain the main similarity and the main difference between map generalization and data classification.	3	
	c) What is the importance of type placement in Cartography? Give an example to clarify your point.	3	
	d) What is cadastral base mapping? What triggers cadastral base mapping updates?	3	
7	a) Discuss the suitability of shape and size visual variables for showing qualitative (nominal) and quantitative (ordinal) map data.	6	
	b) What are Geospatial databases? Explain giving at least two examples.	3	
	c) What are the key elements of the Canadian Geospatial Data Infrastructure?	5	
	d) Two of the methods of producing digital map data are manual digitizing and scanning of existing maps. Discuss clearly the disadvantages of each of these methods.	6	
8	You are to design a colour map for the Web. Discuss the main issues to be considered in designing the map. How will you address those issues?	15	
Total Marks:		100	