

**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 II / ITEM 2

March 2006

HYDROGRAPHIC SURVEYING AND OCEANOGRAPHY

Note: This examination consists of 5 questions on 1 page.

<u>Q. No</u>	<u>Time: 3 hours</u>	<u>Marks</u>	
		<u>Value</u>	<u>Earned</u>
1	Explain in detail (using sketches if necessary) the difference between: a) The Territorial Sea and the Continental Margin. b) Hydrographic Survey Scale and Nautical Chart Scale. c) Sounding Datum and Chart Datum. d) A Sounding Sweep System and a SWATH/Multi-beam System. e) Harmonic and non-harmonic Tidal Constituents. f) Squat and Settlement of a hydrographic survey vessel.	30	
2	a) Describe different methods of calibrating a single beam echo sounder. b) Define and explain all corrections that may have to be applied to a depth obtained by an echo sounder before it is published on an official nautical chart.	5 5	
3	Describe thoroughly with the aid of diagrams the tide raising forces caused by the sun-moon-earth interaction.	10	
4	In the course of conducting a hydrographic survey, why might you perform the following operations? a) Collect sea-bed (bottom) samples? b) Take tidal heights and times at three or more locations within the survey area? c) Use a side scan sonar and a vertical single beam echo sounder on the same vessel? d) Use a lead line to obtain depths, rather than an echo sounder? e) Use a 200 KHz transducer rather than a 30 KHz transducer?	5 5 5 5 5	
5	A major hydro-electric development requires a hydrographic survey of a lake that is approximately 38 km in length. The survey is required to transport equipment and material across and around the perimeter of the lake by a small tug and barge operation. The proposed navigation routes within the lake demand complete survey coverage as well as more detailed surveys of 6 docking/loading sites around the perimeter of the lake. The deepest part of the lake is 47 metres, it is shoal infested, there are numerous narrow navigational channels and there are currents in excess of 2 knots in certain areas. An official hydrographic chart will be produced and published at a scale of 1:20,000 and the dock sites will be chart insets at 1:2,000. Using your own personal assumptions, plan the hydrographic survey(s) required to construct the chart and its insets. Specify initial research of existing mapping data, equipment and methodologies to be utilized, products to be completed, logistics and reporting, etc.	25	
Total Marks:		100	