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 — October 2003

HYDROGRAPHIC SURVEYING AND OCEANOGRAPHY

Note: This examination consists of _10__ questions on _1_ page. **Marks**

Q. No Time: 3 hours — Value — Earned

Q. No		Value	Earned
1	Define and explain the following terms (use diagrams and sketches if necessary): a) Multiple echo(es) (w.r.t. sounder echogram) b) Electronic line of position c) Doppler effect d) Density of soundings e) Wind set-up f) Counter current g) Katabatic wind h) Neap range (tidal) i) isobathytherm j) fairway (w.r.t. waterway)	20	
2	Describe in detail the effect of water temperature, salinity, and pressure changes on the speed of an underwater acoustic wave.	10	
3	Sketch and describe the operation of both magnetostrictive and a piezoelectric transducers.	10	
4	Describe the difference between squat and settlement of a vessel. How may each be measured? How is it applied to a sounding as one of several corrections to obtain true depth?	10	
5	Define false echoes and name/describe five causes of same.	5	
6	Describe in detail the operation of a single beam echo-sounder naming all components. (Use diagrams/sketches)	10	
7	Describe three mechanical ways to obtain water depth. Why would you use these methods in conjunction with and instead of modern-day echo sounding techniques?	10	
8	The following factors influence tidal streams 1) bathymetry; 2) friction; 3) inertia and momentum; 4) coriolis force; 5) river run-off and 6) winds. Describe each and how each affect the stream.	5	
9	Describe acoustic impedance, acoustic reflection, acoustic absorption, reverberation and cavitation.	10	
10	Describe in detail (with sketches) the tide-raising forces caused by the sun-moon-earth interaction. Why are tides much higher in certain areas such as Ungava Bay and the Bay of Fundy?	10	
	Total Marks:	100	