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 2003

HYDROGRAPHIC SURVEYING AND OCEANOGRAPHY

Note: This examination consists of _6_ questions on _2_ pages.

Time: 3 hours

Q. No		Marks Value	Marks Earned
1	Define and explain (with the use of diagrams/sketches if necessary) the following terms: a) abyssal b) windward c) free wave d) barrier reef e) veering wind f) oceanic tide g) territorial sea h) bathythermograph i) cable (a unit of distance) j) compass rose k) sounding selection l) sluice m) reduction of soundings n) thermocline o) continental margin p) leadline q) Nansen bottle r) Matthews table s) Diurnal inequality t) Draft (or draught)	40	

2	A thorough understanding of the propagation velocity of an acoustic wave is fundamental to understanding sonar and echo sounding problems. Explain in detail the following, using formulae if necessary: a) the relationship between the density and the elasticity of the medium through which an acoustic wave is propagating. b) The relationship between the velocity of an acoustic wave in water and the temperature, salinity and pressure (or depth). c) The two main factors that contribute to the propagation loss of acoustic waves as they travel through a homogeneous medium.	15	
3	a) Explain in detail the following statement: "Target strength and range are factors that determine the level of a return echo from a given transmission in an active sonar or echo sounding system"	5	
	b) Describe in detail ambient noise and reverberation as they apply to underwater acoustics.	5	
4	a) Describe in detail (with the aid of diagrams/sketches) the operation of a side scan sonar. Include components, principle of operation, normal vessel fittings/arrangement of components, target signal strength, frequencies, measurement techniques, etc.	10	
	b) It has often been said that "side scan sonar is interpretive rather than his statement.	5	
5	a) Explain the difference between oceanic currents and tidal streams.	2	
	b) Name two principal oceanic surface currents.	1	
	c) Using diagrams and description, explain neap and spring tides.	5	
	d) Tidal constants are classed as harmonic and non-harmonic. Explain each class.	2	
6	a) When would you require a co-tidal chart to reduce soundings?	3	
	b) Explain the process of transferring a sounding datum.	4	
	c) What is the difference between sounding datum and chart datum?	3	
	Total Marks:	100	0