

**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 2004

HYDROGRAPHIC SURVEYING AND OCEANOGRAPHY

Note: This examination consists of 8 questions on 1 page.

Marks

Q. No

Time: 3 hours

Value Earned

1	<p>Explain each of the following (with sketches and diagrams if necessary)</p> <ul style="list-style-type: none"> a) The difference between surface currents and ocean currents b) The difference between a geopotential surface and an isobaric surface c) The difference between upwelling and rip currents d) The difference between a wave period and a wave length e) The difference between Beaufort Scale and Coriolis Force 	25	
2	<p>Describe in detail (with sketches) the tide raising forces caused by the sun-moon-earth interaction. (Your answer must demonstrate that you understand the following terms: barycentre, sub-lunar point and its antipode, tractive forces, spring and neap tide, semi-diurnal and diurnal type of tide.)</p>	15	
3	<p>Describe in detail the operation of a single beam echo-sounder naming all components. (Use diagrams and sketches)</p>	10	
4	<p>Describe the effect of water temperature, salinity and pressure changes on the speed of an underwater acoustic wave.</p>	10	
5	<p>Describe in detail five mechanical methods of determining water depth.</p>	10	
6	<p>Describe the process of:</p> <ul style="list-style-type: none"> a) Recovering an existing water level datum b) Transferring a water level datum c) Reducing soundings to correct for tidal heights d) Calibrating an echo sounder e) Bottom (sea-bed) sampling 	10	
7	<ul style="list-style-type: none"> a) Give five examples of false echoes. b) Describe how frequency beam pattern and range in an echo sounder may be inter-related. 	10	
8	<ul style="list-style-type: none"> a) Describe the difference between squat and settlement of a vessel. b) Why would you use a side scan sonar in conjunction with a single beam echo sounder? 	10	
Total Marks:		100	