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 2005

HYDROGRAPHIC SURVEYING AND OCEANOGRAPHY

Note: This examination consists of _8_ questions on _2_ pages.

Time: 3 hours

Q. No		Marks Value	Marks Earned
1	a) In the course of researching an old hydrographic survey you locate a bathymetric plan/field sheet, original field notes and a field report. The notes and report use the terms: - International Nautical Mile; - Sea Mile; - Fathom; - Cable; and - Knot Define each of the above terms. b) What is an echo sounder? List and describe the functions that every echo sounder must perform. List three basic corrections applied to a depth obtained from a single beam echo sounder. Give four reasons why an echo sounder depth may be incorrect or inaccurate. c) What is a shoal and give evidence that would lead you to suspect a shoal exists in an area.?	5 10 5	
2	a) What is a tsunami, approximately how fast does it travel in the open ocean and what determines its speed? b) In the Pacific Tsunami Warning System what would be the purposes of a network of tide gauges situated at various locations throughout the Pacific Ocean	6 4	
3	What are the major error sources in multibeam sounding systems? How would you measure these errors and compensate for them?	10	
4	Your company has been hired to do a bathymetric survey at an oil terminal. The limits of your survey area overlap with a previous hydrographic survey of an adjacent docking area used for loading/offloading bulk products (ore, coal etc). Upon examination of the overlap area you determine there is a depth discrepancy. What criteria/factors would you use to try to resolve the problem between the two surveys?	10	
5	a) What are spring tides and neap tides and what planetary configuration results in their occurrence? b) Why are tides much higher in certain areas such as Ungava Bay and the Bay of Fundy? c) Define harmonic and non-harmonic tidal constants.	5 3 2	
6	Describe in detail acoustic impedance, acoustic reflection, acoustic absorption, reverberation and cavitation.	10	

7	a) During the course of a hydrographic survey you are requested to collect and retain bottom samples (by a grab method) every 500m throughout the survey area. These samples are then referenced (by coordinates) and sent to a Geological lab for analysis. What information may be obtained from these samples and why could this be important to the survey? b) Describe how you would transfer a water level datum from a primary port to another location with similar tides.	5 5	
8	Define each of the following terms: a) thermocline b) rip current c) squat (of a vessel) d) sounding datum e) under water target strength f) sounding line pattern g) barycentre h) echo sounding hyperbolic effect i) littoral j) drift current	20	
	Total Marks:	100	