

**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

September 2002

HYDROGRAPHIC SURVEYING AND OCEANOGRAPHY

Note: This examination consists of 7 questions on 2 pages.

Marks

Q.No

Time: 3 hours

Value Earned

1.	<p>Define and briefly explain the following terms as they pertain to a body of water.</p> <ul style="list-style-type: none"> a) tsunami b) turbidity c) wind set-up d) velocimeter e) equilibrium tide f) semidiurnal tide g) Beauford wind scale h) amphidromic point i) bore j) cavitation k) co-tidal chart l) rip current m) high seas n) Lagrangian current observations o) mean sounding velocity 	30	
2.	<p>Two main factors that contribute to the propagation loss of acoustic waves as they travel through a water column are the spreading loss and attenuation loss. Explain each, indicating how the loss varies with respect to sound frequency, range, temperature, absorption, etc.</p>	5	
3 a)	<p>Explain in detail the operating principles of an echo sounder. In your explanation please ensure you describe the sonar pulse and the echo sounder components (recorder, transmitter, receiver, transducer, etc.)</p>	10	
b)	<p>Describe the difference between a narrow beam and a wide beam echo sounder. Why/when would you use each?</p>	5	

4 a)	Since its introduction in 1958, side scan sonar has become a widely used tool for sea floor investigations. Describe with the aid of diagrams the components of a side scan sonar and its principle of operation.	10	
b)	Explain the following statement: “Side scan will not replace vertical sounding for accurate depth determination but can be a powerful complementary tool for hydrographic surveying”.	5	
5	Name and describe in detail three (3) mechanical (non-acoustic) methods for the detection of underwater anomalies.	10	
6 a)	Periodic vertical movements of the waters on the earth’s surface are called Tides. Describe in detail, using diagrams, why and how tides occur, and how tides are affected by variations in depth of the sea, shallow water and by frictional resistance.	10	
b)	What is a tide staff and when would you install (use) one: 1) rather than an automatic water level recorder and 2) in conjunction with an automatic water level recorder.	5	
c)	During periods of neap and spring tides, what are the relative positions of the SUN, MOON and EARTH (use sketch in conjunction with description)	5	
7.	Explain with the use of diagrams the different sounding line patterns in shoal examination.	5	
Total Marks:		100	