

CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS

SCHEDULE II / ITEM 2 HYDROGRAPHIC SURVEYING AND OCEANOGRAPHY

March 2009

Although programmable calculators may be used, candidates must show all formulae used, the substitution of values into them, and any intermediate values to 2 more significant figures than warranted by the answer. Otherwise, full marks may not be awarded even though the answer is numerically correct.

Note: This examination consists of 9 questions on 1 page.

<u>Q. No</u>	<u>Time: 3 hours</u>	<u>Marks</u>	
		<u>Value</u>	<u>Earned</u>
1	Define in detail the following terms: a) Ebb stream b) Abyssal c) Fairway d) Isogonic line e) Beaufort Wind Scale f) Thermocline g) Seiche h) Cavitation i) Lead Line j) Foul Bottom (or foul ground)	20	
2	a) Explain in detail how you would determine whether or not a co-tidal chart was required for a hydrographic sounding survey. b) Explain how multiple echo traces are formed on an echogram.	5 5	
3	Describe in detail the forces and factors that affect the strength and extent of tidal streams.	10	
4	Describe the operation of a single beam echo sounder, naming and sketching all components.	10	
5	a) Describe the difference between a magnetostrictive and a piezoelectric transducer. b) Name 5 mechanical methods of determining water depth.	5 5	
6	You are conducting a hydrographic survey in the Beaufort Sea in the Canadian Arctic. A survey was conducted by the Canadian Hydrographic Service (CHS) in 1971 and you are re-examining a shoal that was determined to have a least depth of 3.9 metres. You determine the depth to be 4.7 metres. What may be the causes of the discrepancy between the two surveys?	10	
7	a) Some National Hydrographic Offices like the British Admiralty, CHS, NOAA, etc. are producing both vector and raster charts for use in electronic chart systems. Why would you use an electronic chart system utilizing vector data rather than a raster chart? b) Bathymetric sounding surveys utilizing a single beam echo sounder are normally conducted by running a pattern of parallel straight lines. What factors may determine the distance between these parallel straight lines?	5 5	
8	a) Why is the tidal range in Ungava Bay much larger than in the mid Atlantic Ocean? b) Name and describe two different ways to determine tidal values to be applied to raw depth to reduce soundings to a datum.	5 5	
9	a) What precautions must be taken when conducting a hydrographic survey in an area where a large river runs in to the Atlantic Ocean? b) In Atlantic Canada, off the coast of Cape Breton Island in water depths of 100 metres what would you expect the difference in salinity to be at the surface compared to that found near the ocean floor.	5 5	
Total Marks:		100	