

**CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS
ATLANTIC PROVINCES BOARD OF EXAMINERS FOR LAND SURVEYORS**

SCHEDULE II / ITEM 2

October 2006

HYDROGRAPHIC SURVEYING AND OCEANOGRAPHY

Note: This examination consists of 8 questions on 2 pages.

| <u>Q. No</u> | <u>Time: 3 hours</u> | <u>Marks</u> | |
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| | | <u>Value</u> | <u>Earned</u> |
| 1 | Define each of the following terms: a) tide station b) ebb stream c) dynamic positioning (of a vessel) d) cleared depth e) benthos f) abyssal g) continental shelf edge (shelf break) h) fairway i) surge (of a vessel) j) compass rose | 20 | |
| 2 | Describe the operation of a single-beam echo sounder, naming and sketching each component. | 10 | |
| 3 | a) Describe the process of calibrating a single beam echo sounder. | 5 | |
| | b) Why would you use a 200 kHz transducer rather than a 28 kHz transducer (single beam echo sounder)? | 5 | |
| 4 | a) With the aid of diagrams describe neap and spring tides. | 5 | |
| | b) How would you determine whether or not a co-tidal chart was required for an hydrographic sounding survey? | 5 | |
| 5 | What are the major sources of error to be taken into consideration when obtaining a depth by single-beam echo sounding systems? How would you measure these errors and compensate for them? | 10 | |
| 6 | a) Why is it often necessary to collect bottom samples during the course of a hydrographic survey? | 5 | |
| | b) Why are multiple echo traces often found on an echogram? | 5 | |

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| 7 | <p>During the course of a coastal hydrographic survey, detailed shoal examinations are required to be carried at the mouth of a large river. The tidal range in the shoal areas (at this river mouth) is approximately 1.2 meters. The data from one of the survey vessels (conducting the examinations) shows significant differences (discrepancies) between depths obtained by the single-beam echo sounder and a lead line depth over the same object. The echo sounder transducer used has a beam width of 30° and operates at a frequency of 30 kHz. What may be some of the causes of the discrepancies between the least depth obtained by the echo sounder and that obtained by a lead line on the same bottom feature?</p> | 10 | |
| 8 | <p>A major charting program is required in Labrador in order to safely ship out ore by bulk carrier. A hydrographic survey is required to produce two official charts at a scale of 1:60,000. A chart inset at a scale of 1:5,000 is required for the dock/loading facility.</p> <p>Your company is going to submit a proposal (bid) to conduct the surveys and you are part of a team preparing the submission.</p> <p>Compile a list of questions / issues that you would have to address in order to prepare the documentation.</p> | 20 | |
| | Total Marks: | 100 | |