

CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS

C12 - HYDROGRAPHIC SURVEYING		October 2024	
consists of 13 questions on 1 page.		Marks	
Q. No	Time: 3 hours	Value	Earned
1	Why is it critical that a hydrographic surveyor know the speed of sound in water?	5	
2	Describe Snell's Law and how it is used in acoustic ray tracing.	10	
3	In relation to the frequency of an underwater acoustic signal, what is the tradeoff between vertical resolution and range?	5	
4	You are tasked with planning a singlebeam survey to IHO S-44 order 1B. The survey is in less than 10m of water, in a coastal region, with both hard and soft bottom. Describe the equipment and methods you would use (with your reasoning) to conduct this survey.	10	
5	When using SSS, what factors must be considered when estimating across-track resolution?	5	
6	With an equiangular multibeam setting, describe how beam footprint spacing will change from nadir to the outer beams.	5	
7	What is an inertial measurement unit (IMU) and what does it measure?	5	
8	Describe the importance of time synchronization in multibeam systems and surveys, and discuss how time can be managed.	10	
9	Discuss the issues you must take into consideration when selecting a suitable site(s) for the installation of a water level gauge(s) for the purpose of hydrographic surveying.	10	
10	What is the vertical datum used on nautical charts and how does it differ from a geodetic vertical datum?	5	
11	What method of elevation measurement would be most appropriate for determining the height difference between a reference benchmark and a water level gauge? Why?	5	
12	What IHO S-44 specification would you recommend for a harbour survey? Why?	5	
13	Describe what factors you would take into account when planning and developing a cost estimate for a multibeam charting survey.	20	
		100	