

CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS

C12 - HYDROGRAPHIC SURVEYING		June 2020	
Note: This examination consists of 15 questions on 1 page.		Marks	
Q. No	Time: 3 hours	Value	Earned
1.	Name the three ocean parameters that affect sound velocity in the ocean.	5	
2.	Write the equation that relates frequency, wavelength and sound velocity.	5	
3.	Draw a typical sound velocity profile from the warm upper layers, through the thermocline to the deep ocean.	5	
4.	In relation to underwater acoustics define frequency.	2.5	
5.	In relation to underwater acoustics define pulse duration (pulse length).	2.5	
6.	In relation to the frequency of an underwater acoustic signal, what is the tradeoff between vertical resolution and range?	5	
7.	What is the relationship between transducer size and its beamwidth?	5	
8.	Describe a bar check procedure for single beam operations. Make sure you include a discussion on why and when this procedure is performed.	10	
9.	With the help of a diagram, describe the relationship between ellipsoidal, geoidal and tidal vertical datums, as used in hydrographic operations. Explain how each are derived, what they are used for and how they are related to each other.	10	
10.	Write the equation that describes the relationship between sound velocity (SV), depth (d) and the two-way-time of travel (TWTT).	5	
11.	You are tasked with finding a lost MB transducer head (20cmX20cmX20cm) in 10m of water on hard bottom. What frequency would you use and how would you deploy your SSS? Explain your reasoning.	10	
12.	Specific to hydrographic applications, describe the difference between Multibeam Sonars and Side Scan Sonars. Include a discussion of what each would be used for and why.	10	
13.	What are crosscheck lines and what are they used for?	5	
14.	Describe the basic principles of MBES transmit and receive beam forming and steering using curved transducers.	10	
15.	What IHO S-44 specification would you recommend for a harbour survey? Why?	10	
Total		100	