

<b>CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS</b>			
<b>C12 - HYDROGRAPHIC SURVEYING</b>			<b>March 2015</b>
<b>Note: This examination consists of 10 questions on 1 page.</b>			<b>Marks</b>
<b>Q. No</b>	<b>Time: 3 hours</b>	<b>Value</b>	<b>Earned</b>
1.	Please define the following in one or two sentences:		
	a) LIDAR	2	
	b) GNSS	2	
	c) Shoal Exam	2	
	d) Spring Tide	2	
	e) RTK	2	
	f) Lead Line	2	
	g) Heave	2	
	h) Patch Test	2	
	i) Chart Datum	2	
	j) S-44	2	
2.	Name the three ocean parameters that effect sound velocity in the ocean.	3	
	Which one has the greatest effect near the sea surface?	1	
	Which one has the greatest effect in the deep ocean?	1	
3.	With the help of a diagram, describe the components necessary for reducing water depth easurements from a singlebeam transducer face to a chart datum.	6	
	Describe three of the main sources of vertical uncertainty involved in this reduction.	4	
4.	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	
5.	What factors contribute to the total vertical uncertainty of a sounding derived from a multi-beam system?	10	
6.	With the help of diagrams, describe what side scan sonar (SSS) is and how it works.	10	
7.	With the help of a diagram, describe the various vertical datums used in hydrographic operations. Explain what each datum is used for and how it is related to the others.	10	
8.	Describe 5 different non-acoustic depth measuring techniques.	5	
9.	What are the advantages and disadvantages of using a multibeam echo sounding system over a single beam echo sounder for charting surveys?	10	
10.	Describe the purposes of nautical charting surveys including all essential data to ensure safety of navigation. Describe everything you would take into account in order to plan and conduct a hydrographic survey for charting	10	
		100	
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