

**CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS**

**E-2 HYDROGRAPHIC SURVEYING**

**March 2011**

**Note: The use of calculators or similar devices is not permitted in this exam.**

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

<b><u>Q. No</u></b>		<b><u>Time: 3 hours</u></b>		<b><u>Marks</u></b>	
		<b><u>Value</u></b>	<b><u>Earned</u></b>		
1.	Define each of the following in one or two sentences:				
	a) Sound Channel	2			
	b) RTK	2			
	c) Multibeam Sonar	2			
	d) Heave	2			
	e) LIDAR	2			
	f) Neap tide	2			
	g) DGPS	2			
	h) Chart Datum	2			
	i) sounding	2			
j) Snell's Law	2				
2.	a) Name the three ocean parameters that effect sound velocity in the ocean.	3			
	b) Draw a typical sound velocity profile in the open ocean.	3			
	c) Which parameter has the greatest effect in the upper (near surface) region?	2			
	d) Which parameter has the greatest effect in the lower (towards bottom) region?	2			
3.	With the help of a diagram, describe the components necessary for reducing water depth measurements from a singlebeam transducer face to a chart datum.	5			
4.	Describe the basic principles and limitations of multibeam sonars.	9			
5.	Describe three different non-acoustic depth measuring techniques.	6			
6.	Explain tides, making sure you include: generating forces, daily and monthly periods, amplitude ranges, etc.	10			
7.	Explain how GPS can be used in hydrography. Describe some of the different techniques and associated accuracies.	10			
8.	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			
9.	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.	20			
<b>Total Marks:</b>		100			