

CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS

C12 - HYDROGRAPHIC SURVEYING		October 2014	
Note: This examination consists of 12 questions on 1 page.		Marks	
Q. No	Time: 3 hours	Value	Earned
1.	Please define the following in one or two sentences:		
	a) USBL	2	
	b) GNSS	2	
	c) Uncertainty	2	
	d) Spring Tide	2	
	e) Neap Tide	2	
	f) Lead Line	2	
	g) Bar Sweep	2	
	h) Phase differencing MB	2	
	i) Squat	2	
	j) Countinuous wave (in regard to acoustics)	2	
2.	With the help of a diagram, describe Snell's Law.	5	
3.	With the help of a diagram, explain how Snell's Law is used in acoustic ray tracing.	5	
4.	With the help of a diagram, describe the design of a multi-transducer, boom and acoustic sweep system.	5	
5.	Describe the effect of transducer spacing, beam width and survey speed on full bottom ensonification from a multi-transducer, boom and acoustic sweep system.	5	
6.	With the help of diagrams, describe what side scan sonar (SSS) is and how it works.	7	
7.	How can SSS be used in single beam hydrographic surveys?	3	
8.	In single beam surveys, what is a "bar check" and what is it used for?	10	
9.	Summarize the differences between beam forming and phase differencing multibeam systems.	10	
10.	Compare and contrast the use of multi-beam versus airborne bathymetric LIDAR in hydrography. Include descriptions of when (and why) LiDAR is more suitable than the MB and vice versa.	10	
11.	With the aid of diagrams/sketches describe thoroughly the tidal effects caused by the sun-moon-earth interaction.	10	
12.	Describe the 4 basic survey "orders" as defined in the <i>S-44 IHO, 5th Edition, Standards for Hydrographic Surveying</i> . Include:		
	a) horizontal and vertical uncertainties for soundings	10	
	b) minimum object detection size		
	c) bottom coverage		
		100	