CANADIAN BOARD OF EXAMINERS FOR PROFESSIONAL SURVEYORS

	C12 - HYDROGRAPHIC SURVEYING	October 2021	
	Note: This examination consists of 12 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.	What is the difference between a Linear Frequency Modulated (LFM) pulse (CHIRP) and a continuous wave (CW) pulse?	5	
4.	Why is it necessary to apply pitch and roll observations to narrow-angle single beam transducers and not wide-angle single beam transducers, under normal survey conditions? Use a diagram in your answer.	10	
5.	With the help of a diagram, describe the components necessary for reducing water depth measurements from a singlebeam transducer to a chart datum.	10	
6.	Describe the importance of time synchronization in multibeam systems and surveys, and discuss how time can be managed.	10	
7.	Describe how you would connect a local vertical datum to a newer vertical datum such as the Canadian Geodetic Vertical Datum 2013 (CGVD2013).	10	
8.	With the help of a diagram describe the relationship between ellipsoidal and geoidal heights.	10	
9.	Under what circumstances would it be more appropriate to use a singlebeam and sidescan sonar combination rather than a multibeam system? Explain you answer.	10	
10.	Describe the checks, verifications and calibrations and other quality control procedures you would typically carry prior to during and after survey.	10	
11.	What is an ENC and how is it derived from hydrographic information?	10	
12.	What is an inertial measurement unit (IMU) and what does it measure?	5	
		100	