ASSOCIATION OF CANADA LANDS SURVEYORS - BOARD OF EXAMINERS
WESTERN CANADIAN BOARD OF EXAMINERS FOR LAND SURVEYORS
ATLANTIC PROVINCES BOARD OF EXAMINERS FOR LAND SURVEYORS

SCHEDULE II / ITEM 1 — October 2005

GEODETIC POSITIONING

Note: This examination consists of 5 questions on 1 page.

Time: 3 hours

Q. No		Marks Value	Marks Earned
1	Consider the following observation equation for GPS carrier phase, observed from a particular receiver *A* to a particular satellite *i*: $\Phi_A^i = \rho_A^i + c(dT_A - dt^i) + \lambda N_A^i + d_{ion}^i + d_{trop}^i$ where Φ is the carrier phase observation, ρ is the receiver-satellite geometric distance, c is the speed of light in vacuum, dT is receiver clock offset, dt is satellite clock offset, λ is carrier wavelength, N is initial integer ambiguity, d_{ion} is the delay caused by signal propagation through the ionosphere and d_{trop} is the delay caused by signal propagation through the troposphere. Derive the equation for the double difference observation between receivers *A* and *B* and satellites *i* and *j*.	25	
2	Define the following terms: (a) Vernal Equinox (b) Right Ascension and Declination (c) Local Astronomical System (d) Meridian Convergence (e) WGS84 (f) ITRF2000 (g) NAD83 (h) Arc-to-chord correction	40	
3	Define the geoid. With the advent of space geodetic techniques, is the geoid still important for geodesy? Why or why not?	10	
4	Define 1D, 2D, 3D and 4D positioning.	10	
5	What is the advantage of using two signals at two different frequencies in a satellite system?	15	
	Total Marks:	100	