

The University of Melbourne

Semester 2 Assessment 2004

Department: Geomatics
Subject Number: 451-337
Subject Title: Satellite Positioning and Geodesy
Reading Time : 15 minutes
Writing Time : 3 hours

This paper has 3 pages including this cover page

Authorised Materials:

Electronic calculators are permitted

Instructions to Invigilators:

Students require script books

Instructions to Students:

All four (4) questions are to be attempted
All answers are to be written in the script books provided
All questions carry equal marks

Baillieu Library:

Paper is to be archived in the Baillieu Library

1. In transforming from AGD66 or AGD84 to GDA94, it is generally important to account for and to eliminate distortion. In this context, provide detailed answers to the following :
- What is distortion and why does it exist?
 - How can the presence of distortion be determined?
 - What options exist for accounting for distortion in the transformation process?
 - When might it be preferable to ignore distortion and use a conformal transformation?

(30 marks)

2. (a) Using an appropriately detailed and annotated diagram, describe and illustrate what a GPS receiver measures when tracking the L1 and L2 carriers.

(10 marks)

- (b) Using your answer to question 2(a) as a foundation, compare and contrast the measurement process used by a GPS receiver tracking the C/A-code.

(5 marks)

- (c) In relation to the GPS carrier phase observable, discuss and demonstrate the advantages and disadvantages of *measurement differencing*.

(15 marks)

3. (a) The ionosphere and the troposphere are two significant sources of error in GPS positioning. Describe the ionosphere and the troposphere, paying particular attention to discuss their influence on the GPS signals and to identify and evaluate strategies for eliminating or minimising ionospheric and tropospheric refraction.

(20 marks)

- (b) Explain the consequences of trying to integrate a GPS survey with a levelling survey in a single least squares adjustment. What steps would need to be taken to ensure that such a combination was being undertaken in a rigorous manner?

(10 marks)

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4. (a) Give complete definitions for the following :

- GDA94
- Geoid
- Integer ambiguity
- Precise ephemeris
- Cycle slip

(15 marks)

(b) Explain the flow of data within the GPS Control Segment and between the Control Segment and the Space Segment.

(15 marks)

>>>>>>>>> End of Examination <<<<<<<<<<