



# GWANDA STATE UNIVERSITY

FACULTY OF ENGINEERING AND ENVIRONMENT

DEPARTMENT OF GEOMATICS AND SURVEYING

Satellite Geodesy

EGS 3207

Final Examination Paper

This examination paper consists of 4 pages

Time Allowed : 3 hours

Total Marks : 100

Examiner's Name : Mr. T T CHIGOVA

## INSTRUCTIONS

1. Answer **ALL 4** questions
2. Each question carries **25** marks
3. Use of calculators is permissible, but programmable calculators are not allowed in the exam

<p><b>1. a)</b></p> <p><b>i)</b> Ephemeris</p> <p><b>ii)</b> Loss of lock</p> <p><b>iii)</b> Anti-spoofing</p> <p><b>b)</b></p> <p>As a leading surveyor, you have been tasked to carry out a new project in a different city few hundreds kilometers from the location of your town. As you have arrived to your project site, you start up your GNSS receiver set, it occurred to you that the receiver could not attain lock of the satellites. Give a detailed account as to why this is so, and how best you can address the challenge you are facing.</p> <p><b>c)</b> You are required to describe the main components of a complete modern GPS receiver set to a group of surveyors. Write an essay of the presentation outlining the parameters one would need to consider in choosing the best receiver to buyer for their organization.</p>		<p><b>3</b></p> <p><b>3</b></p> <p><b>3</b></p> <p><b>8</b></p> <p><b>8</b></p>
<p><b>2.</b></p>	<p><b>a)</b>Briefly, describe the following terms:</p> <p><b>(i)</b> Satellite Altimetry</p> <p><b>(ii)</b> Apparent coordinate system</p> <p><b>b)</b> The orbital motion/constellation of satellites is believed to have been determined by multiple variables, of which the Keplerian laws have proven to be valid to some extent. If so, give a brief account of such principles, what they really define; and justify what are variables and how do they affect motion of satellites in space.</p>	<p><b>5</b></p> <p><b>5</b></p> <p><b>15</b></p>

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<b>3</b>	a) Explain the concept of Doppler effect, and how can a geomatician substantially reduce its effects?	<b>8</b>
	b) Briefly explain what is meant by differencing data, and what its limitations are?	<b>9</b>
	c) Distinguish between double and triple differencing	<b>8</b>
<b>4</b>	a) Differentiate between GPS observables; the pseudo-ranging and carrier phase ranging.	<b>5</b>
	b) As a leading Surveyor, give a detail account of how do you substantially solve the integer ambiguity number in your GPS observables.	<b>5</b>
	c) Briefly describe the characteristics of a 50 MHz GPS data stream.	<b>5</b>
	d) As a consultant Geomatician, justify the benefits of integrating satellite geodesy observation data with terrestrial deformation monitoring surveys and precision farming.	
	i)     GIS	<b>5</b>
ii)    Precision farming	<b>5</b>	

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