



**FACULTY OF ENGINEERING AND ENVIRONMENT  
DEPARTMENT OF GEOMATICS AND SURVEYING  
SATELLITE GEODESY  
EGS 3207**

**Final Examination Paper**

**2023**

**This examination paper consists of 3 pages**

**Time Allowed: 3 hours**

**Total Marks: 100**

**Examiner's Name: Mr C. Musiiwa**

**INSTRUCTIONS**

1. Answer **ALL** Questions.
2. Marks are as allocated on each question.
3. Use of calculators is permissible

<b>Question 1: Define the following terms using relevant examples</b>		
1	a. Ionosphere shift	5
	b. Pseudo range	5
	c. Satellite-Based Augmentation System	5
	d. Location Based Services (LBS)	5
	e. GNSS (Global Navigation Satellite System).	5
<b>Question 2: GNSS</b>		
2	a. Write notes on the following systems 1. Sputnik 2. Glonass 3. GPS	10
	b. Satellite orbits can be classified as  1. Geostationary orbit (GEO) 2. Low Earth orbit (LEO) 3. Medium Earth orbit (MEO) 4. Polar orbit and Sun-synchronous orbit (SSO) 5. Transfer orbits and geostationary transfer orbit (GTO)  Elaborate on the above mentioned orbits.	20
		6
<b>Question 3: GNSS Positioning Techniques</b>		
3.	a. Differentiate between the following point positioning methods 1. Single point and observable difference 2. Differential Positioning, Wide Area Differential Positioning and wide area augmentation system	10
	b. What is anti-spoofing and how does it affect the precision of the measurements in Surveying	5
	c. Elaborate using well labelled diagrams on how a GPS base computes the coordinates of a point on the earth's surface using satellites	10

<b>Question 4: Applications of GNSS (25 Marks)</b>		
	a. Write notes on the application of GNSS in 1. Wireless Communications and Network Systems. 2. Drone Surveys 3. Construction Site Automation 4. Hydrographic survey 5. Military	20
<b>End of Exam</b>		