



FEDERAL UNIVERSITY OF TECHNOLOGY
SCHOOL OF ENVIRONMENTAL TECHNOLOGY
DEPARTMENT OF SURVEYING & GEOINFORMATICS
SECOND SEMESTER EXAMINATION 2018/2019 SESSION

COURSE TITLE: Satellite and Space Geodesy **COURSE CODE:** SVG521

CREDIT UNIT: 2 **TIME:** 2hrs

INSTRUCTION: Answer any **Three (3)** question

Q1. (a) Write briefly on the following terms using relevant diagrams where necessary:

- (i) Very Long Baseline Interferometry (VLBI) (5Mks)
- (ii) Satellite Laser Ranging (SLR) (5Mks)
- (iii) Satellite Altimetry (5Mks)

(b) Which of the Newton's three laws of motion described the equation of satellite motion? Give the basic equation of satellite motion in accordance with Newton's law of universal gravitation; define the parameters of the equation

(5Mks)

Q2. (a). Define Satellite geodesy and discuss its relationship with other fields of geodesy (10Mks)

(b) State the formulation of two-body problem and explain the significant of the three Kepler's laws of planetary motion to satellite orbital motion. (10Mks)

Q3. (a) Explain in detail using relevant diagram, the concept of geometrical and dynamical satellite geodesy.

(10Mks)

(b) With the aid of a well annotate diagram, Identify the six Keplerian orbital parameters. (5Mks)

(c) Distinguish normal satellite orbits from perturbed satellite orbits and identify the forces influencing satellite orbit. (5Mks)

Q4. (a) Identify the major sources of error in GNSS positioning and specify their contributory error range in single and dual GPS observation modes. (5Mks)

(b) Discuss the segment composition of a typical GNSS system and Complete the table below:

GNSS Type Acronym	No of Satellites	Orbital altitude	Number of orbital planes	Orbital plane inclination	L1. Freq.	L2. Freq.	Orbital period	Geodetic Coordinate system
GPS								
GLONASS								
Galileo								

(10Marks)

(c) What are the basic problems that satellite geodesy seek to address?

(5Mks)