GWANDA STATE UNIVERSITY

FACULTY OF ENGINEERING AND ENVIRONMENT

DEPARTMENT OF GEOMATICS AND SURVEYING

SURVEYING II

ESG2208

Examination Paper

June 2026

This examination paper consists of 3 pages

Time Allowed: **3 hours**

Total Marks: 100

Examiner: F. Shumba

INSTRUCTIONS

Calculator is required

Answer all questions

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QUESTION 1

i. With the aid of diagrams , briefly explain the anatomy of the following equipment:-
Level machine, Theodolite and Total Station? **6 Marks**

ii. With the aid of a sketch, define what is collimation error, test measures and mitigation measures? **9 Marks**

iii. List the three axis of a Total Station, errors associated with them, possible test measures and mitigation? **10 Marks**

QUESTION 2

With the aid of well labelled sketches, calculation summary and accuracy assessment procedures define the following:-

i. Loop Traversing **8 Marks**

ii. Link Traversing **8 Marks**

iii. Using formulae and sketches define the following:-
Joins
Polars
Intersection
Triangulation
Resection **9 Marks**

QUESTION 3

Define the coefficient of refraction K, and show how its value may be obtained from simultaneous reciprocal trigonometric leveling observations? **5 Marks**.

Two triangulation stations A and B are 2856.85 m apart. Observations from A to B gave a mean vertical angle of $+01^0$ 35' 38", the instrument height being 1.41 m and the target height 2.32 m. If the level of station A is 556.86 m above mean level and the value of K for the area is 0.16, calculate the reduced level of B (radius of Earth = 6372 km). **20 Marks**

QUESTION 4

i. Outline the critical steps to take in a setting out project? **7 Marks**

ii. What is the difference in Horizontal and Vertical Setting out? **9 Marks**

iii. With the aid of sketches describe in detail what is:-

Coordinate System

Transformation

Conversion **9 Marks**

THE END