# GWANDA STATE UNIVERSITY

## FACULTY OF ENGINEERING AND ENVIRONMENT

### DEPARTMENT OF GEOMATICS AND SURVEYING

**SURVEYING II -ESG2208**

**Examination Paper, April 2025**

**Time Allowed:** **3 hours** **Total Marks: 100**

**Examiner: F. Shumba**

Answer all questions This examination paper consists of 7 pages

**QUESTION 1**

i. Define the following terms: - Join

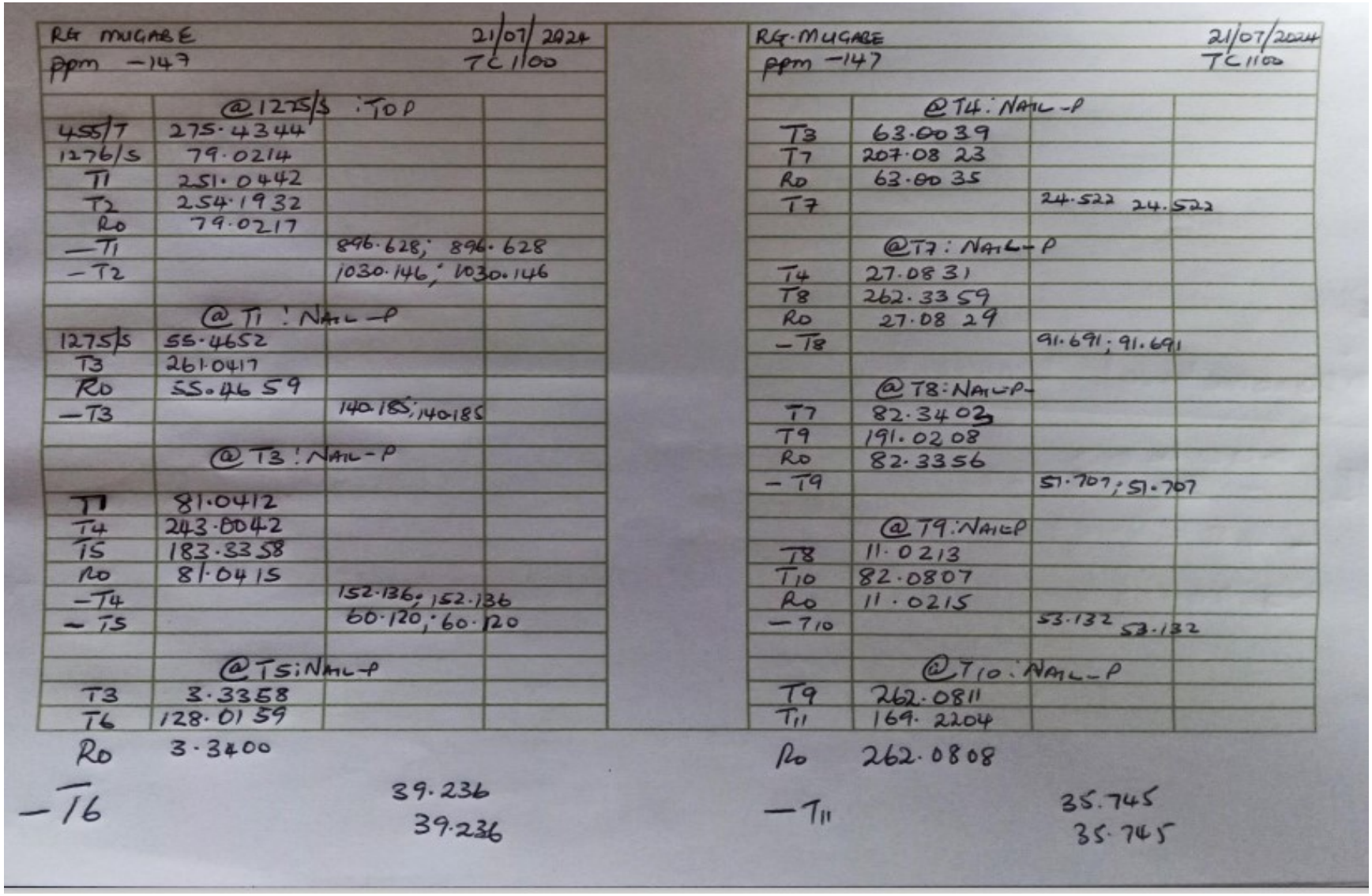
Polar

Traverse

Bowditch 4 Marks

ii. Calculate the traverse with the attached field books, giving Coordinates with the following Constants:-

| | Y | X | |
|---|---|---|---|
| Constants | -20,000.00 | 2,330,000.00 | 21 Marks. |



RG MUGABE 21/07/2024
ppm −147 TC 1100

| | @1275/S : TOP | | |
|---|---|---|---|
| 455/T | 275.4344 | | |
| 1276/S | 79.0214 | | |
| T1 | 251.0442 | | |
| T2 | 254.1932 | | |
| R0 | 79.0217 | | |
| −T1 | | 896.628; 896.628 | |
| −T2 | | 1030.146; 1030.146 | |
| | @T1 : NAIL-P | | |
| 1275/S | 55.4652 | | |
| T3 | 261.0417 | | |
| R0 | 55.4659 | | |
| −T3 | | 140.185; 140.185 | |
| | @T3 : NAIL-P | | |
| T1 | 81.0412 | | |
| T4 | 243.8042 | | |
| T5 | 183.3358 | | |
| R0 | 81.0415 | | |
| −T4 | | 152.136; 152.136 | |
| −T5 | | 60.120; 60.120 | |
| | @T5 : NAIL-P | | |
| T3 | 3.3358 | | |
| T6 | 128.0159 | | |
| R0 | 3.3400 | | |
| −T6 | | 39.236 | |
| | | 39.236 | |

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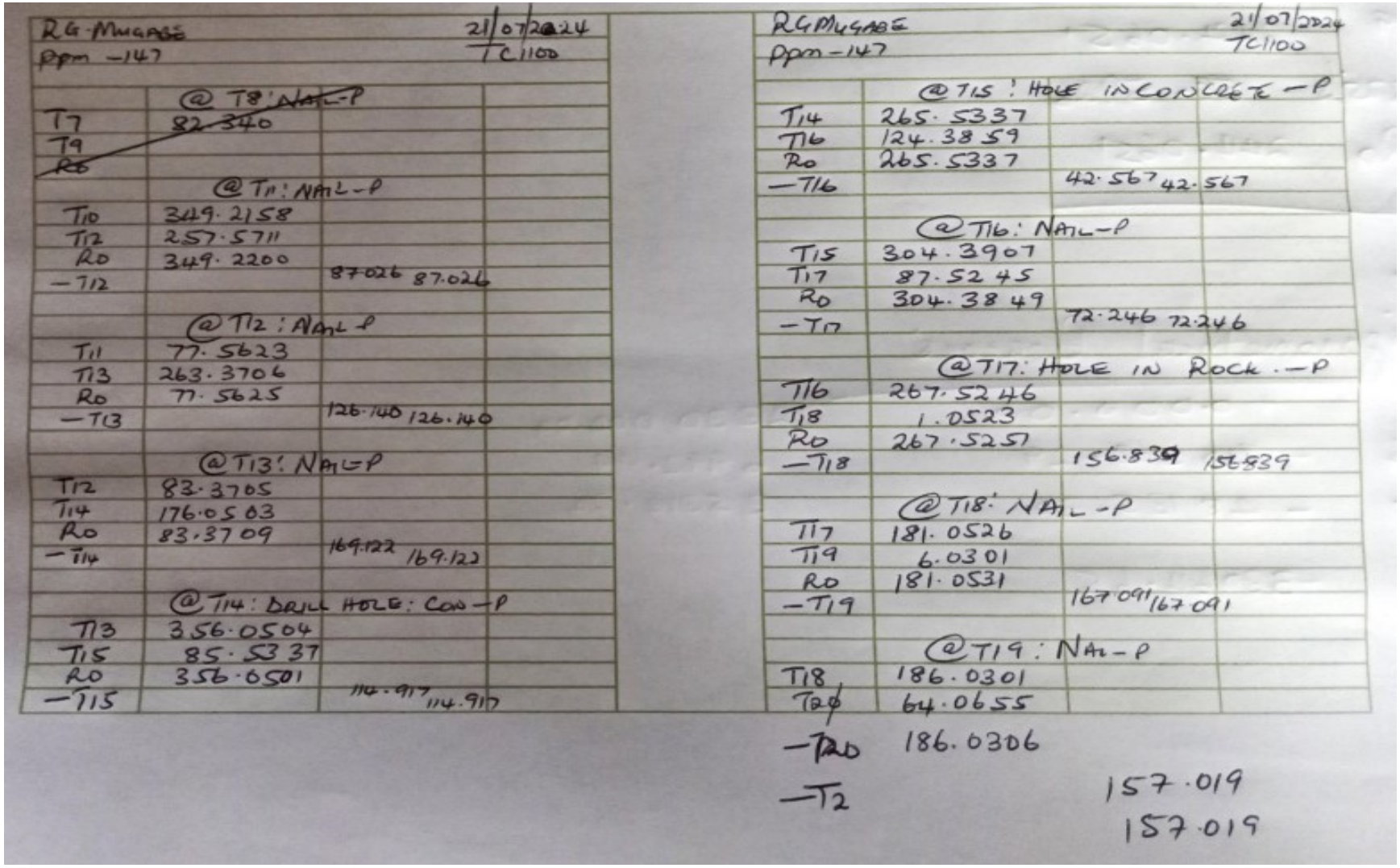
| | @T4 : NAIL-P | | |
|---|---|---|---|
| T3 | 63.0039 | | |
| T7 | 207.0823 | | |
| R0 | 63.0035 | | |
| T7 | | 24.522 | 24.522 |
| | @T7 : NAIL-P | | |
| T4 | 27.0831 | | |
| T8 | 262.3359 | | |
| R0 | 27.0829 | | |
| −T8 | | 91.691; 91.691 | |
| | @T8 : NAIL-P | | |
| T7 | 82.3403 | | |
| T9 | 191.0208 | | |
| R0 | 82.3356 | | |
| −T9 | | 51.707; 51.707 | |
| | @T9 : NAIL-P | | |
| T8 | 11.0213 | | |
| T10 | 82.0807 | | |
| R0 | 11.0215 | | |
| −T10 | | 53.132 | 53.132 |
| | @T10 : NAIL-P | | |
| T9 | 262.0811 | | |
| T11 | 169.2204 | | |
| R0 | 262.0808 | | |
| −T11 | | 35.745 | |
| | | 35.745 | |



RG Mugabe 21/07/2024
ppm -147 TC1100

| | | |
|---|---|---|
| | @ T8: ~~NAIL-P~~ | |
| T7 | 82.340 | |
| T9 | | |
| R0 | | |
| | @ T11: NAIL-P | |
| T10 | 349.2158 | |
| T12 | 257.5711 | |
| R0 | 349.2200 | |
| -T12 | | 87.026 87.026 |
| | @ T12: NAIL P | |
| T11 | 77.5623 | |
| T13 | 263.3706 | |
| R0 | 77.5625 | |
| -T13 | | 126.140 126.140 |
| | @ T13: NAIL-P | |
| T12 | 83.3705 | |
| T14 | 176.0503 | |
| R0 | 83.3709 | |
| -T14 | | 169.122 169.122 |
| | @ T14: DRILL HOLE: CON-P | |
| T13 | 356.0504 | |
| T15 | 85.5337 | |
| R0 | 356.0501 | |
| -T15 | | 114.917 114.917 |

RG Mugabe 21/07/2024
ppm -147 TC1100

| | | |
|---|---|---|
| | @ T15: HOLE IN CONCRETE -P | |
| T14 | 265.5337 | |
| T16 | 124.3859 | |
| R0 | 265.5337 | |
| -T16 | | 42.567 42.567 |
| | @ T16: NAIL-P | |
| T15 | 304.3907 | |
| T17 | 87.5245 | |
| R0 | 304.3849 | |
| -T17 | | 72.246 72.246 |
| | @ T17: HOLE IN ROCK. -P | |
| T16 | 267.5246 | |
| T18 | 1.0523 | |
| R0 | 267.5251 | |
| -T18 | | 156.839 156.939 |
| | @ T18: NAIL-P | |
| T17 | 181.0526 | |
| T19 | 6.0301 | |
| R0 | 181.0531 | |
| -T19 | | 167.091 167.091 |
| | @ T19: NAIL-P | |
| T18 | 186.0301 | |
| T20 | 64.0655 | |
| -T20 | 186.0306 | |
| -T2 | | 157.019 157.019 |

@ T2: 12mm IP-P

| | |
|---|---|
| T19 | 242.0651 |
| 1275/S | 58.5926 |
| R0 | 244.0651 |

| | Y | X |
|---|---|---|
| 1275/S | -40568.29 | 2336992.99 |
| 1276/S | -33064.65 | 2341187.66 |
| 455/T | -48135.30 | 2335313.24. |

**QUESTION 2**

1. To obtain the zero error of a particular EDM instrument, a base line AD is split into three sections AB, BC and CD and measured in the following combinations:

   AB = 20.512, AC = 63.192, AD = 153.303

   BC = 42.690, BD = 132.803, CD = 90.1201

   Using all possible combinations, compute the zero error. **10 Marks**

iii. @ T1 $H_i$:- 1.420m

   T3 55°48'14" Zenith angle: 81°44'26"

   @T2 $H_i$: 1.410m

   T3 66°39'44" Zenithal Angle: 92°47'09"

| | X | Y | Z |
|---|---|---|---|
| T1 | 1032.454 | 1104.345 | 452.987 |
| T2 | 995.978 | 921.546 | 478.895 |

Calculate the X, Y, Z Coordinates of T3? **15 Marks**

**QUESTION 3**

i. What is Trigonometric Heighting? Use a diagram to illustrate. **8 Marks**

ii. Derive the formulae for the Elevation of two points from Trigonometric Heighting for short distances? **10 Marks**

**iii.** With the aid of well elaborated examples, briefly define Conversion and Transformation? **7 Marks**

**QUESTION 4**

Define the following with the aid of diagrams and formulas:-

i. What is the difference between a Map and a Site Plan? **6 Marks**

ii. Describe in detail, the mapping process from Project Conception to presentation of final product. Include the use of Softwares in your answer? **13 Marks**

iii. Briefly explain the difference between WGS84 Gauss Lo 29 and Clarke 1880 UTM 36 S? **6 Marks**

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**THE END**

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