GWANDA STATE UNIVERSITY

FACULTY OF ENGINEERING AND THE ENVIRONMENT

DEPARTMENT OF GEOMATICS AND SURVEYING

SURVEY I

ESG 1108

Examination Paper

Semester I 2024

This examination paper consists of 3 pages

Time Allowed: **3 hours**

Total Marks: 100

Examiner's Name: Mr. V Mlilo

INSTRUCTIONS

1. *Answer **ALL** Questions in chronological order.*
2. *Scientific Calculators may be used.*
3. *Programmable calculators are **not** allowed*

1	a		What do you understand by the term reconnaissance? State its importance	5
	b		State any **five** branches within the geomatics field and describe in detail what they entail.	15
2	a		Briefly discuss any four methods of obtaining differences in height in levelling.	12
	b		Define any ***four*** of the following terms	
		i	Horizontal Line	
		ii	Bench Mark	
		iii	Reduced Level (RL)	
		iv	Change Point	
		v	Level Line	8
3	a	i	Give a detailed account of the differences between plane surveys and geodetic surveys.	4
		ii	Compare and contrast the Rise and Fall Method with the Height of Collimation Method	4
	b		Outline the differences between precision and accuracy	2
	c		With a well-labelled diagram, describe how you would carry out the two-peg test on an automatic level.	10
4	a		The following consecutive readings were taken with a level and a 4.0-metre staff on a continuously sloping ground at a common interval of 30 metres. 0.780, 1.535, 1.955, 2.430, 2.985, 3.480, 1.155, 1.960, 2.365, 3.640, 0.935, 1.045, 1.630 and 2.545 The RL of the first point A was 180.75m. Rule out a page of a level book and enter the above readings. Calculate the RL of all the points by the Rise & Fall Method. Also, calculate the gradient of the line joining the first and last point.	10
	b		It was required to ascertain the elevations of two points A and B; a line of levels was run from A to B. The levelling was then continued to B.M. of elevation 100m. The readings obtained are shown. Obtain Reduced Levels of A and B. Use any method. Apply the necessary checks.	
		i		10

St No	B.S.	I.S.	F.S.	R.L.	Remarks
1	3.90				A
2	1.450		3.96		
3	3.95		2.14		
4		2.35			B
5	3.35		0.85		
6	3.50		2.95		
7	3.90		3.10		
8			2.50	100	BM

5	a		Explain (with the aid of a diagram) the plane survey method of:	
		i	Intersection & Resection.	4
	b	i	Define a contour.	1
		ii	Write an exhaustive account of the defining characteristics of contours.	3
	c		The following distances and directions were measured starting at point A with known coordinates, then B to C, C to D and D to E.	

Point A	Y	X
	+10 427.680	+1 972 485.620
	Direction **a**	Distance **S**
B	229◦28’03”	127.547
C	325◦05’51”	123.859
D	46◦37’42”	187.890
E	177◦51’10”	102.552

			Using the data given in the table, calculate ***dy*** and ***dx*** for A to B, C, D & E.	4
			Using the ***dy*** and ***dx*** found, calculate the coordinates of points B, C, D and E.	4
	c		Briefly discuss Gauss Conformal as a coordinate system used in surveying and mapping within the southern Africa region.	4

END OF PAPER