namibia university
OF SCIENCE AND TECHNOLOGY

FACULTY OF NATURAL RESOURCES AND SPATIAL SCIENCES

DEPARTMENT OF GEO-SPATIAL SCIENCES AND TECHNOLOGY

QUALIFICATION : NATIONAL DIPLOMA IN ENGINEERING (CIVIL AND PROJECT MANAGEMENT)	
QUALIFICATION CODE: 35DCPM	LEVEL: 6
COURSE CODE: SUR110S	COURSE NAME: SURVEYING 1
SESSION: JULY 2019	PAPER: THEORY
DURATION: 2 HOURS	MARKS: 80

SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER:	Mr. T. Makaza
MODERATOR:	Mr. S. Sinvula

INSTRUCTIONS	
1.	You MUST answer ALL the questions.
2.	Write clearly and neatly.
3.	Number the answers clearly.
4.	Make sure your Student Number is on the EXAMINATION BOOK(s).
5.	Make sure your Student Number is on all the Data Sheets and that you submit them with your EXAMINATION BOOK(s).

PERMISSIBLE MATERIALS

1. Calculator
2. Ruler
3. Pencil
4. Eraser

THIS QUESTION PAPER CONSISTS OF 5 PAGES (Including this front page)

Question 1

1.1. Give the term for each of the following statements or explanations or procedures:

   a. Surveys that take into account the true shape of the earth.   (1)

   b. Surveys that are concerned with the planning, design and placing of pegs in the field of engineering works, such as roads, railways, dams, canals, tunnels services in townships.   (1)

   c. Errors that are caused by a defective instrument.   (1)

   d. The calculation of coordinates for point B, given the coordinates of point A and a distance and direction from point A to B.   (1)

   e. The amount by which a point is higher than the preceding point.   (1)

   f. A level plane with an assumed height of zero and to which heights of points may be referred.   (1)

   g. An instrument that is used to measure horizontal and vertical angles.   (1)

   h. A traverse that starts at a known point and ends at an unknown point.   (1)

   i. The technique which uses a stand-alone GNSS receiver to obtain positions.   (1)

   j. A measure of the strength of satellite geometry that is related to the spacing and position of the satellites in the sky.   (1)

1.2. Mention ANY FIVE error sources in GPS use (exclude Selective Availability).   (5)

1.3. Explain in detail how a reverse direction can be calculated.   (2)

                                                                                    [17]

Question 2

2.1. State ANY SIX corrections that can be applied to Electronic Distance Measurements (EDM) on the Namibian LO coordinate system.   (6)

2.2. Explain the principle that is used to determine height differences when trigonometrical heighting is applied.   (2)

2.3. In terms of the Namibian coordinate system, state the direction angles contained in each quadrant as well as the correct signs for the y and x coordinates in the customary format (y;x).

(8)

[16]

Question 3

3.1 Explain the importance of earthwork volumes and area calculations in engineering projects.

(2)

3.2 On Data Sheet 1 are given reduced levels for a proposed pipeline at chainages of 10 metres. If the design gradient between chainage 0 metres and chainage 50 metres is given as +1/20, calculate the formation level at each chainage and indicate the amount of CUT or FILL.   (10)

3.3 Name the THREE methods that can be used to determine areas of figures. State typical situations where each one is suitable for use.   (6)

[18]

Question 4

4.1. Explain what a traverse is.   (2)

4.2. Outline ANY FIVE requirements for traverse stations.   (5)

4.3. Calculate coordinates for the traverse A-B-C-D-E-F using the given orientated directions and reduced distances. Use Data Sheet 2 to answer this question. (Adjustment of the traverse should be done to THREE decimal places using the Bowditch).   (20)

4.4. Determine the accuracy of the traverse. (2)

[29]

Student Number: _____   **Data Sheet 1**

Question 3.2

Chainage	Reduced Level	Formation Level	Cut(+)	Fill (-)
0.00	1100.55	1100.55		
10.00	1105.25			
20.00	1104.22			
30.00	1101.28			
40.00	1104.54			
50.00	1102.65			

Student Number: _____   Data Sheet 2

Question 4.3

<u>Bowditch Rule - Adjustment Sheet</u>

Oriented Directions and Final Horizontal Distances	Differences		STATION	Final	Co-ordinates
	ΔY	ΔX		Y	X
			A	- 1800.00	+ 7250.00
90-00-00					
355.96					
			B		
151-29-10					
251.25					
			C		
245-00-20					
429.65					
			D		
315-47-00					
460.36					
			E		
72-49-40					
245.53					
			A	-1800.00	+7250.00