



**MASINDE MULIRO UNIVERSITY OF SCIENCE AND
TECHNOLOGY
(MMUST)**

MAIN CAMPUS

**UNIVERSITY MAIN EXAMINATIONS
2023/2024 ACADEMIC YEAR**

THIRD YEAR FIRST SEMESTER EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF EDUCATION TECHNOLOGY
IN BUILDING AND CIVIL TECHNOLOGY**

COURSE CODE: TEB: 341

COURSE TITLE: ENGINEERING SURVEY I

DATE: 7TH DECEMBER 2023

TIME: 8 A.M – 10 A.M

INSTRUCTIONS:

1. This paper contains FIVE questions
2. **Question ONE (1) is Compulsory**
3. **Attempt a total of FOUR questions in this booklet.**
4. Marks for each question are indicated in the parenthesis.

Examination duration is **2 Hours**

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

Question 1 **COMPULSORY** **(30 marks)**

- a) Differentiate between geodetic and plane surveying (4 mks)
- b) Name and distinguish between any TWO types of plane surveying (2mks)
- c) By use of a sketch, illustrate step chaining method of direct linear measurement (3mks)
- d) A 30M tape which had elongated by 40mm was used to measure the distance between two manholes A and B. If the measured distance was found to be 24.504m, calculate the true distance between the manholes (3mks)
- e) Siting TWO specific examples, distinguish between systematic errors and gross errors. State appropriate mitigation measures for each type (6mks)
- f) The survey data below was obtained during field activity for the design of a road, reduce the data with respect to;

B.S	I.S	F.S	H.C	R.L	REMARKS
4.230				950.00M	
	2.870				
	0.660				
3.150		0.810			
		4.450			

Perform arithmetic checks (6mks)

- g) Briefly describe the "Give and Take" method of plan area estimation (4mks)
- h) List any TWO sources of errors in levelling (2mks)

Question 2 **(20 marks)**

- a) Name any TWO Indirect Linear Measurement Techniques (2mks)
- b) The following Levelling data was observed and recorded during a levelling exercise. Reduce the level by Rise and Fall method and apply the necessary checks (12mks)

B.S	I.S	F.S	REMARKS
2.919			(A+00M),B.M.I (1027.113M A.O.D)
3.022		0.461	A+20m
	1.508		A+40m
	2.553		A+60m
2.298		0.277	A+80m
	1.602		A+100m
1.782		1.422	A+120m
		1.998	(A+140)BM2 (1033.120m, A.O.D)

- c) Define the following terms as applied in levelling survey (1mk)
 - i. Back sight (B.S) (1mk)
 - ii. Intermediate sight (1mk)
 - iii. Height of collimation (1mk)
 - iv. Change point (1mk)
- d) Explain the stages of field survey (2mks)

Question 3 (20 marks)

- a) Using a well labeled diagram, explain the procedure of levelling survey (6mks)
- b) The survey data shown below was obtained during a field level activity, reduce the data using rise and fall method ensure to perform arithmetic checks (6mks)

B.S	I.S	F.S	Rise	Fall	R.L	REMARKS
4.230					950.00M	
	2.870					
	0.660					
3.150		0.810				
		4.450				

- c) The table below contains data on areas within the underwater contours of a dam

Contour (m)	240	238	236	234	232
Area enclosed (m ²)	4150	3460	2630	184	1210

Calculate the volume of water contained in the reservoir between contour 240m and 232m by end area formula (4mks)

- d) Explain the uses of any FOUR parts of a planimeter (4mks)

Question 4 (20 marks)

- a) Compute the area of a land parcel, in Acres enclosed by a figure with values shown in the table below using Simpson's formula. Assume offset interval of 30m (4mks)

Ordinate label	X1	X2	X3	X4	X5	X6
Ordinate height (m)	2.4	3.8	4.2	2.6	3.0	2.7

- b) Discuss any THREE applications of leveling in the civil engineering (9mks)
- c) Explain the following reliability of measurements terminologies (1mk)
 - i. Accuracy (1mk)
 - ii. Precision
- d) Explain any five corrections that should be made on measured distances using tapes or chains (5mks)

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