(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS 2022/2023 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER EXAMINATIONS

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

COURSE CODE: TEB 342

COURSE TITLE: ENGINEERING SURVEYING II

DATE: 13TH APRIL 2023   **TIME: 8 – 10 A.M**

INSTRUCTIONS:
1. This paper contains FIVE questions
2. **Question ONE (1) is Compulsory**
3. **Attempt a total of THREE 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 5 Printed Pages. Please Turn Over.

QUESTION ONE (30 MARKS)

a) Distinguish between Give and Take method and graphical methods of irregular area estimation stating any 2 factors each that influence the accuracy level of each method   (4mks)

b) A series of perpendicular offsets were taken from a baseline to a curved boundary of a river as indicated in the table. Determine the area enclosed using Simpson's Rule   (4mks)

Distance (m)	0	10	20	30	40	50	60	70
Offset (m)	2.2	2.6	0.85	1.24	2.05	1.66	1.00	0.84

c) Outline FOUR uses of angular measurement in engineering survey   (4mks)

d) State any FOUR main differences between an optical theodolite and a total station   (4mks)

e) The figure below represent the X-section of a canal in Ahero Irrigation Scheme
   i.   Calculate the side slope   (2mks)
   ii.   Compute the X-section area   (2mks)

2.5m

_____ 2.0m_____
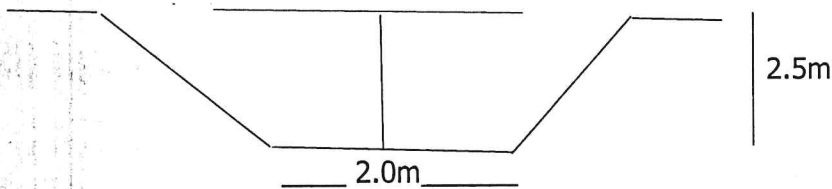
f) Explain the temporary adjustment of a theodolite during a field traverse (5mks)

g) Using an illustration, show that the volume of a ground tank can be obtained from

$$V = \tfrac{1}{4} \text{ Area} (\Sigma h_1 + \Sigma h_2 + \Sigma h_3 + \Sigma h_4)$$

(5mks)

QUESTION TWO (20 MARKS)

a) State any FOUR sources of errors in theodolite traversing and suggest corresponding control to enhance accuracy   (4mks)

b) Given the angular measurements of a loop traverse, calculate the included angles   (5mks)

	Target Stn	F.L Rdg	F.R Rdg
	A	024^0 32' 05"	204^0 32' 08 "
Stn Q	B	120^0 06' 10"	300^0 05' 58"
	C	215^0 42' 44"	035^0 42 ' 50"
	D	284^0 58' 08"	104^0 57' 59"
	A	024^0 32' 12"	204^0 31' 56"

c) The figure below shows the x-section of a land surface from a trapezoidal channel is to be excavated. Calculate the area of the cross section (7mks)
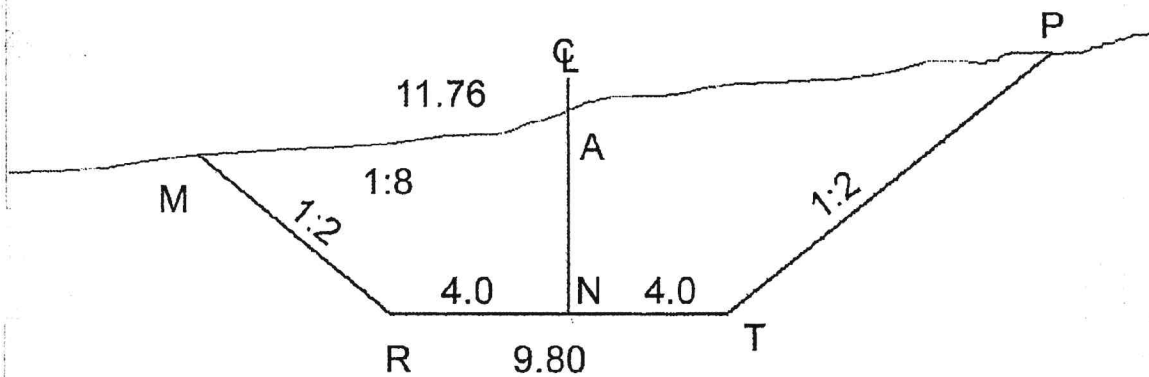
d) Explain the functions of the following parts of a theodolite
   i.   Telescope   (1mk)
   ii.   Vertical circle   (1mk)
   iii. Lower plate   (1mk)
   iv.   Clamp   (1mk)

QUESTION THREE(20 MARKS)

a) Given the cordinates of two points A and B are known. NA (338.466Mn, EA =469.421Me) and (310.617Mn, 501.035Me). Compute the horizontal distance between the traverse stations A and B and the W.C.B of the line AB

                                                                      (6mks)

b) By use of a sketch, show that the Total Area of a planning site bounded by a river on one side can be given by

$$A = \frac{W}{2}\{h_1 + 2(h_2 + h_3 + \ldots\ldots\ldots h_{n-1}) + h_n\}$$

(5mks)

c) Compute the area of a parcel of land in acres if it is enclosed by the plan figure represented by the following offsets using Simpson's formula (4mks)

| Offset label	A	B	C	D	E	F
Offset height (m)	2.4	3.8	4.2	2.6	3.0	2.2

d) Cross-sections were drawn from a level survey at 25m intervals along a proposed road. From station 1 at chainage 00m to station 9 at chainage 200m, the cross- section areas of cut were found to be:

$00\ m = 30\ m^2$ $75\ m = 48\ m^2$ $150\ m = 31\ m^2$

$25\ m = 35\ m^2$ $100\ m = 53\ m^2$ $175\ m = 26\ m^2$

$50\ m = 42\ m^2$ $125\ m = 42\ m^2$ $200\ m = 18\ m^2$

Calculate the volume of water bounded by the contours   (5mks)

QUESTION FOUR (20 MARKS)

a) Explain the following terms applied in theodolite application

   i.   Transiting   (2mks)

   ii.   Changing face   (2mks)

   iii.   Swinging the telescope   (2mks)

b) Convert the following quadrant reading to W.C.B

   i.   N 12 ^{0} 24' E   (2mks)

   ii.   S 31 ^{0} 36 0 E   (2mks)

c) Calculate the volume of concrete required to cast the gravity dam shown below   (4mks)
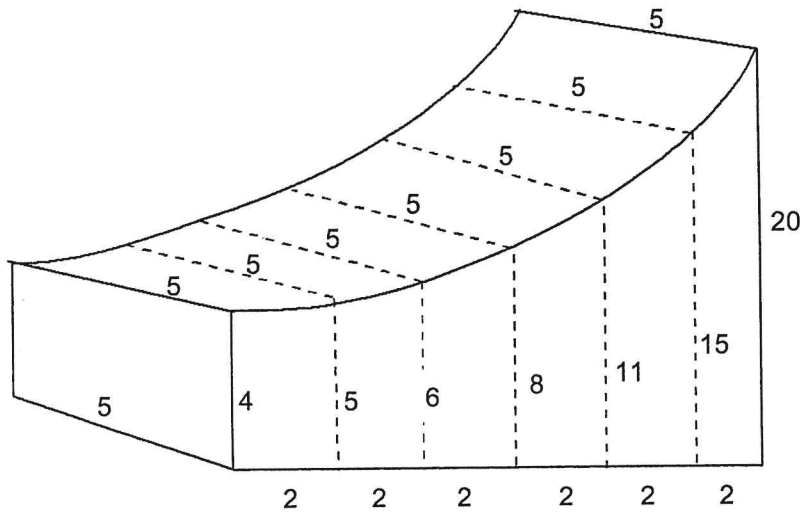
d) Explain any THREE significance of reconnaissance during a field level survey (3mks)

e) Explain any THREE applications of tachometric method in survey (3mks)

QUESTION FIVE

a) Using a labeled and neat sketch, illustrate and briefly explain the principle of stadia tachometry (4mks)

b) Name any FOUR specific sources of errors in Tachometric surveying (4mks)

c) Outline any THREE temporary adjustments to the tachometry principle equipment's (3mks)

d) The following records were obtained from the field while carrying out traversing. Compute the latitudes, departures and error closure hence the precision (9mks)

	Bearing		Length (ft)
	Degrees	Minutes	
AB	S 6	15 W	189.53
BC	S 29	38 E	175.18
CD	N 81	18 W	197.78
DE	N 12	24 W	142.39
EA	N 42	59 W	234.58