



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY
Department of BUILDING & Civil engineering
UNIVERSITY EXAMINATION FOR:

DIPLOMA IN CIVIL ENGINEERING

DCE 2208 : SURVEYING III

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: NOVEMBER 2024
TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

-non-programmable scientific calculator

This paper consists of **five** questions.

Attempt any **THREE** questions.

Do not write on the question paper.

QUESTION ONE (20 marks)

- a) Shown in table 1 is the data for a plot of land. Determine the area of the plot by the prismoidal method.

Table 1:

Chainage(m)	0	20	40	60	80	100	120	140	160	180
Offset (m)	2.0	4.45	12.46	19.38	21.94	14.86	11.12	6.01	3.79	2.09

(4 marks)

- b) Fig 1 shows the cross-section of an embankment. Calculate the following for the cross-section:

- side widths
- cross-sectional area

(7 Marks)

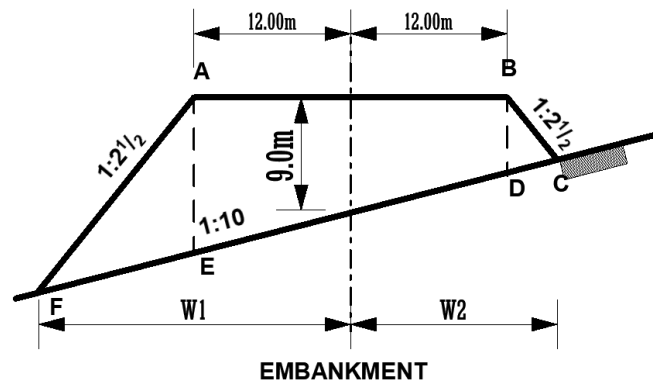


Fig 1

- c) Determine the area enclosed by a line of a closed traverse survey KLMNPK from the as shown in table 2:

Table 2:

station	Easting(m)	Nothings(m)
K	500.00	552.78
L	406.98	767.87
M	462.55	545.15
N	592.03	421.90
P	497.71	398.44

(8 Marks)

QUESTION TWO (20 Marks)

- a) State any three uses of mass- haul diagrams.

(6 Marks)

- b) State any four properties of mass-haul diagrams.

(4 Marks)

- c) A road has a formation width of 15m and side slopes of 1:1 in cut, and 1:2 in fill. The original ground has a cross-fall of 1:6. If the depth of excavation at the centreline is 0.8m, calculate the side widths and the areas of fill and cut .

(10 Marks)

QUESTION THREE (20 marks)

Section of a canal 40.00m long has a formation width of 10.0m and is to be formed on ground that is level longitudinally but with the formation rising at 1.120 longitudinally so that the centre height of the first cross-section has a centre height of 3.20m. Given the side slopes as 1:2 and that the formation and the original ground are level at right angles to the centreline. Calculate the following for the canal:

- The centre heights of the second and third cross-sections 20m apart
 - The cross-sectional areas of the first, second and third cross-sections
 - The volume of excavation of the 40m length of the canal by the END AREAS formula.
- (20 Marks)**

QUESTION FOUR (20 Marks)

The data shown in fig 2 and table 2 is for a closed loop polygonal traverse KLMNK. Given the coordinates of point 'K' as 1: 1050.00mE, 1500.00mN and the corrected whole circle bearing of the, calculate the coordinates of points 'L, M and 'N', adjusting for any misclosure by the Bowditch's method.

(20 Marks)

TABLE 2

Line (m)	LENGTH	CORRECTED WHOLE CIRCLE BEARINGS		
	(m)	0	/	//
KL	24.92	164	54	56
LM	18.97	161	58	48
MN	15.05	65	30	40
NK	15.91	334	49	51

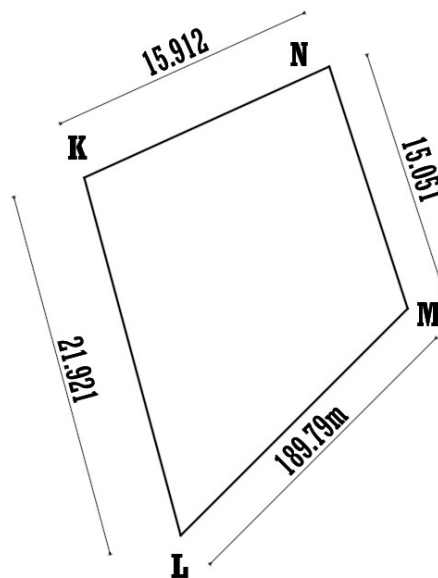


Fig 2

QUESTION FIVE (20 Marks)

- a) (i) State any FOUR points to be considered in the selection of stations in a theodolite traverse.
(ii) Differentiate between the terms true meridian and arbitrary meridian

(6 Marks)

During a traverse survey one of the traverse legs was measured in catenary in one bay with a 150.00m steel tape standardized with a tension of 7.2Kg at 20°C and on the flat. After the survey the steel tape was compared with another linear measuring device known to be accurate and it was found to measure 149.983m only. Given the coefficient of thermal expansion of the tape material as 0.000011m per °C, and weigh 1.8Kg, using the information shown in table 3, calculate the corrected length of the line.

(10 Marks)

Table 3

bay	Measured length (m)	Day temperature °C	Height (m)	Field Tension (Kg)	Altitude (m)	tape Cross-sectional area (mm ²)
1	449.872	34	9° 30' 00"	9.55	700.00	1.51