



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2306 : ENGINEERING SURVEY III

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE:

Instructions to Candidates

You should have the following for this examination

-*Answer Booklet, examination pass and student ID*

-*Drawing instruments.*

This paper consists of five questions.

Attempt any THREE questions.

Do not write on the question paper.



Question ONE (Compulsory)

- a). Tabulate the data required to set out a simple circular curve using a chain and a tape. The radius of the curve is given as **600 m** connecting two straights deflecting at an angle of **18°24'** and the chainage of the intersection **I** is **2140 m** (use standard chord of 20 m) (10 Marks).
- b). A cutting is to be made in the ground which has a traverse slope of 1:5. The width of the formation was 10 m and the side slope are 1 vertical to 2 horizontal. If the depths of the center lines of the three sections of 30 m apart were 3.0, 4.5 and 6.2 m respectively. Determine the volume of the earth over this length (14 Marks).
- c). A cutting is to be made in the ground which has a traverse slope of 1:2. The width of the formation was 14 m and the side slope are 1 vertical to 2 horizontal. If the depths of the center lines of the 4.0 m determine the widths and the area of the cutting (6 Marks).

Question TWO

- a). A road has a formation breadth of 9 m and the side slopes of 1 in cut, and 1 in 3 fill. The original ground has a cross – fall of 1 in 5. If the depth of excavation of two sections 20 m apart are 0.4 and 0.6 m respectively, calculate the volumes of both the cut and the fill over this length (6 Marks).
- b). The coordinates of a polygon A, B, C, D and E were recorded as follows:

Station	E (m)	N (m)
A	200.00	400.00
B	306.98	285.65
C	368.60	282.02
D	492.93	248.80
E	291.74	185.70

If the steel tape used during the measurements was found to be 0.1 m too short, determine the corrected area of the plot to the nearest hectares (10 Marks).

- c). State Simpson's rule. Determine the area of a plot given the offsets scaled from a plan at an interval of 20 m. The information was provided as follows:

Offset (m):	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆	O ₇	O ₈	O ₉	O ₁₀
Length (m):	16.76	19.81	20.42	18.59	16.76	17.68	17.68	17.37	16.76	17.68



(4 Marks).

Question THREE

The diagram below show excavation about the existing ground levels on a 15 *12.5 m rectangle grids that form part of a site which is to be excavated on a uniform formation level of 10 m above the datum. Calculate the volume of the earth to be excavated assuming vertical sides by using rectangular and triangular shapes

(12 Marks).

Diagram

b). In order to find the volume of water in a reservoir the following contours were recorded:

Contour (m): 100 98 96 94 92

Area (m²) : 3150 2460 1630 840 210

Determine the volume of water in the reservoir using end area and prismoidal methods (4 Marks).

c). Define the following terms as used in **Mass Haul Diagrams**:

i). Haul (1 Mark).

ii). Free Haul (1 Mark).

iii). Mass Haul Diagram (1 Mark).

iv). Average Haul (1 Mark).

Question FOUR

a).

b). Discuss Planimeter and its essential parts.....

Question FIVE

- a) Tabulate the data required to set out a simple circular curve using a chain and a theodolite. The radius of the curve is given as **600 m** connecting two straights deflecting at an angle of **18°24'** and the chainage of the intersection **I** is **2140 m** (use standard chord of 20 m) (14 Marks).
- b) Describe the following methods as used in determining the areas of irregular figures:
- i). Give and take lines (2 Marks).
 - ii). Trapezoidal rule (2 Mark).
 - iii). Counting squares (2 Marks).

