



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

Second Year Second Semester Examination for Diploma in Civil Engineering and Diploma in Building Technology

BCECD & BCEBD 214: ENGINEERING SURVEYING III

Date: 03/12/2015

Time: 8:30 – 10:30 am

Instructions:

- This paper comprises of **five** questions
- Question **one** is **compulsory** and carry 30 marks
- Answer **question one** and any **other two** questions

- a) Define the term 'Mass Haul Diagram' (2 marks)
 - b) State three methods of setting out right angles in survey work (3 marks)
 - c) Describe four characteristics of a mass haul diagram (10 marks)
 - d) Using an elaborated well labeled sketch describe the working principle of a polar arm planimeter used in measurement of areas of irregular figures from scaled drawings. (8 marks)
 - e) Explain the significance of 'through chainage' concept in curve ranging (3 marks)
 - f) Derive an expression for calculating the length of the long chord in terms of the radius and the angle of deviation of the curve (4 marks)
- a) Explain the process of setting out as applied to in surveying (6 marks)
 - b) A section of a sewer 60m long is to be laid between two manholes A and B. the invert of manhole A is 30.02m. The gradient between A and B is to be 1:100 falling from A to B. if a 3.75m traveler is available and the ground levels at A and B are 32.90m and 31.95m respectively. Calculate;

- i) Reduced level of sight rail at A
- ii) Invert reduced level at B
- iii) Reduced level of sight rail at B
- iv) The staff readings necessary to fix positions of sight rails at A and B if a reduced level setup nearby has a height of collimation of 34.845m.
- v) Depths of excavation at A and B (14 marks)

3 a) Show that the area of a polygonal plot whose rectangular coordinates are known is given by the expression, $A = \frac{1}{2} \sum_{r=0}^{r=n} N_r (E_{r+1} - E_{r+1})$ (10 marks)

b) The following observations were recorded from a survey traverse exercise on a plot whose points were 50m apart from a fixed reference meridian.

POINTS		A	B	C	D	E	F	G	H	I
INDEPENDENT	NORTH (Y)	100	711	635	994	241	844	266	811	100
CO-ORDINATES (m)	EAST (X)	802	802	852	902	952	1002	1052	1102	1102

Calculate the area of the plot using;

- i. The coordinate method
- ii. Trapezoidal formula (10 marks)

4 a) Determine the length of the long chord for a 300m radius curve connecting two straights deviating at $47^\circ 50'$ (4 marks)

b) A 250m radius curve is to be set out to connect two straights deflecting at $39^\circ 30' 40''$. The chainage at the intersection is 497.50m and the pegs are to be placed at 25m intervals on through chainage basis. Compute and tabulate the setting out data using offsets from chords produced. (16 marks)

5 a) Define the following terms

- i. A prismoid
- ii. ii) Prismoidal correction (2 marks)

b) With an aid of well annotated simple sketches, explain the procedure of setting out a two roomed building block and the use of profile boards for horizontal control and transfer of measurements to the ground on a new site.

(18 marks)