



**TECHNICAL UNIVERSITY OF MOMBASA**

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FACULTY OF ENGINEERING AND TECHNOLOGY  
DEPARTMENT OF BUILDING & CIVIL ENGINEERING  
**UNIVERSITY EXAMINATION FOR:**  
DIPLOMA IN BUILDING AND CIVIL ENGINEERING

EBC 2105 : ENGINEERING SURVEY II

END OF SEMESTER EXAMINATION

**SERIES: DECEMBER 2016**

**TIME: 2 HOURS**

**DATE: 22 Dec 2016**

**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

- a) The coordinates of a point A are 311.617mE, 447.245mN. Calculate the coordinates of
- Point B where  $\theta_{AB} = 37^{\circ}11'20''$  and  $D_{AB} = 57.916M$
  - Point C where  $\theta_{AC} = 205^{\circ}33'55''$  and  $D_{AC} = 85.071M$  **(8 marks)**
- b) In an exercise to determine distances between two points A and B a tacheometer was set up at P and the following observations recorded.

Staff at	Vertical Angle	Staff Reading		
		upper	middle	lower
A	+5°12'	1.388	0.978	0.610
B	-27°35'	1.604	1.286	0.997

Given the height of the instrument was 1.50m, the reduced levels of point P=315.600m and the constants k and c are 100.00 and 0.00m respectively. Determine the reduced levels of point A and B. **(12 marks)**

### Question Two

- a) Define the following types of curves
- Simple curve
  - Transition curve
  - Compound circular curve
  - Reverse circular curve **(6 marks)**
- b) Derive the setting out data for a curved line if the radius of the curve is 12m, the angle of intersection is 90° and offsets are required at 2m intervals. **(14 marks)**

### Question Three

- a) With the aid of a well labelled sketch, derive a relation that can be used to compute area of an irregularly shaped surface by the trapezoidal method **(7 marks)**
- b) The coordinates below were obtained from a survey activity

Station	Eastings(m)	Northings(m)
E	300.00	412.78
F	206.98	567.84
G	468.55	245.12
H	392.93	324.98
I	291.74	198.45

Determine the area enclosed by the coordinates. Give your answer in hectares **(7 marks)**

- c) In chain surveying the following offsets were taken to a fence from a chain line. Compute the area bounded by the chain line and the offsets. **(6 marks)**

Chainage (m)	130	150	170	190	210	230	250	270	290	310
Offset (m)	0	6.45	10.46	9.38	11.94	14.86	10.12	5.01	2.79	1.09

#### **Question Four**

- a) Define the following terms as used in mass haul diagrams
  - i. Haul
  - ii. Shrinkage
  - iii. Borrow
  - iv. Waste
  - v. Free haul distance
  - vi. Limit of economic haul **(6 marks)**
- b) Briefly discuss the procedure used in the construction of a mass haul diagrams **(8 marks)**
- c) Discuss the uses of mass haul diagrams in civil engineering works **(6 marks)**

#### **Question Five**

- a) Discuss the following
  - i. Open traverse
  - ii. Closed traverse **(4 marks)**
- b) State the points to be considered when selecting a traverse station. **(4 marks)**
- c) Discuss the common errors in traversing **(6marks)**
- d) Discuss the four types of plans that will be required during the process of setting out **(6 marks)**