



# TECHNICAL UNIVERSITY OF MOMBASA

*Faculty of Engineering & Technology in Conjunction with Kenya  
Institute of Highways & Building Technology (KIHBT)*

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

HIGHER DIPLOMA IN BUILDING ECONOMICS

## **EBC 3108: SITE SURVEYING & SETTING OUT II**

END OF SEMESTER EXAMINATIONS

**SERIES:** APRIL 2014

**TIME:** 2 HOURS

### **INSTRUCTIONS:**

- You should have the following for this examination:
  - Answer booklet
  - Calculator
- This paper consists of **FIVE** questions.
- Answer any **THREE** questions.

***This paper consists of Three printed pages.***

## QUESTION 1

a) Define the following terms as applied in theodolite work:

- i) Centering
- ii) Swing
- iii) Face right
- iv) Trunnion axis
- v) Leveling.

(5 marks)

b) Outline the procedure of the following horizontal angular measurement methods by use of a theodolite:

- i) Reiteration
- ii) Repetition

(10 marks)

c) Take the datum co-ordinates as shown below and compute the distance and bearing between:

HE and HC

HE 2496.700ME 2009.500mN

HC 2983.600ME 2122.200mN

(5 marks)

## QUESTION 2

a) i) Define the term tacheometry.

ii) Differentiate between stadia and tangential systems of tacheometry.

(3 marks)

b) State **FOUR** points to be considered in selection of stations for a theodolite traverse.

(4 marks)

c) i) Define **TWO** types of traverses.

ii) State any **TWO** purposes of theodolite traversing.

(6 marks)

d) With the aid of a sketch, explain the leveling procedure of a theodolite.

(7 marks)

## QUESTION 3

a) State the function of the following plane table accessories:

- i) Plumbing fork
- ii) Alidade
- iii) Trough compass

(3 marks)

b) With the aid of a sketch, describe the intersection method in plane table surveying.

(12 marks)

c) Compute the backbearing of the following whole circle bearings:

- i)  $180^{\circ}30'$
- ii)  $80^{\circ}30'$
- iii)  $308^{\circ}40'$
- iv)  $220^{\circ}20'$

v)  $45^{\circ}00'$

(5 marks)

#### QUESTION 4

A circular curve is to be set out to connect two straights with a total deflection angle of  $42^{\circ}$ . If the chainage of the point of intersection and the first tangent point are 500.46m and 418.68m respectively. Calculate:

- a) Radius of the curve
- b) Length of the curve
- c) Setting out data for 30m chords by deflection angle.

(20 marks)

#### QUESTION 5

- a) A theodolite was set up at station X and observations made to points  $Y_1$  and  $Y_2$  as shown in table 1 below.

Table 1

Inst Station	Staff Station	Horizontal reading	Vertical angle	Hairs (m)		
				Lower	Mid	Upper
X	$Y_1$	$293^{\circ}32'41''$	$-3^{\circ}31'43''$	1.000	1.530	2.060
	$Y_2$	$031^{\circ}32'41''$	$+4^{\circ}00'13''$	1.180	1.570	1.960

Assuming that the theodolite was fitted with anallatic lenses

- i) Determine the horizontal distances  $Y_1$  and  $Y_2$  from instrument station X.
  - ii) Determine the horizontal distance  $Y_1Y_2$ .
- b) Compute the following whole circle bearings (WCB) into quadrantal bearings (QB).
    - i)  $350^{\circ}40'$
    - ii)  $190^{\circ}20'$
    - iii)  $170^{\circ}10'$
    - iv)  $80^{\circ}00'$

(10 marks)

(4 marks)

- c) Describe the following parts of a planimeter:
  - i) Pole block
  - ii) Pole arm
  - iii) Tracing arm
  - iv) The integrating unit

(6 marks)