



**THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE**

**(A Constituent College of JKUAT)**

(A Centre of Excellence)

# **Faculty of Engineering & Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

**DIPLOMA IN BUILDING & CIVIL ENGINEERING**

**DIPLOMA IN ARCHITECTURE**

EBC 2129: ENGINEERING SURVEYING I

**END OF SEMESTER EXAMINATION**

**SERIES: DECEMBER 2012**

**TIME: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*
- *Pocket Calculator*
- *Pencil & Eraser*

This paper consists of **FIVE** questions. Answer any **THREE** questions  
Maximum marks for each part of a question are as shown  
This paper consists of **THREE** printed pages

### Question One

- a) After completing a survey, the 30m tape used was checked and found to read 29.067m long.
- (i) Determine the correct length of the line AB observed to be 130.49m long
  - (ii) The area of the site was calculated from the observed measurement as 2.804ha. Calculate the true area. **(4 marks)**
- b) With the aid of a sketch, describe the following chain surveying equipment:
- (i) Open cross staff
  - (ii) Ranging rod
  - (iii) Drop chain arrow **(11 marks)**
- c) Define the following terms as used in chain surveying:
- (i) Base line
  - (ii) Survey station
  - (iii) Survey line
  - (iv) Tie line
  - (v) Check line **(5 marks)**

### Question Two

- a) Define the following terms used in leveling:
- (i) Bench mark
  - (ii) Change point
  - (iii) Back sight
  - (iv) Foresight
  - (v) Reduced level
  - (vi) Horizontal line **(6 marks)**
- b) (i) State any **FOUR** sources of errors in leveling:
- $\frac{d}{2R}$
- (ii) Show that curvature correction X is given by  
Where d = length of line of sight  
R = Radius of earth. **(8 marks)**
- c) Briefly describe the following types of leveling staff
- (i) Telescopic
  - (ii) Folding
  - (iii) Single length **(6 marks)**

### Question Three

- a) Define the following terms as applied in contouring:
- (i) Contour line
  - (ii) Vertical interval
  - (iii) Horizontal equivalent **(3 marks)**

- b) With the aid of a sketch, explain the direct method of contouring.  
c) Explain the procedure of leveling a dumpy level. **(11 marks)**

#### Question Four

The following readings were successively taken with a dumpy level during a leveling exercise:

1.680, 1.720, 2.000, 2.440, 3.120, 2900, 2.140, 2.000, 0.520, 2.260,  
2.620, 2.960, 3.340, 0.880.

The first reading was taken on a bench mark whose reduced level was 120.000m. The position of the instrument was changed after taking the 8<sup>th</sup> and 12<sup>th</sup> readings.

- (i) Draw up a level field book  
(ii) Enter the reading by the height of collimation method  
(iii) Determine the reduced levels of all the points  
(iv) Apply arithmetic check **(20 marks)**

#### Question Five

- a) Differentiate between the following:  
(i) Geodetic survey and plane survey  
(ii) Chainage and chaining  
(iii) Trilateration and triangulation **(6 marks)**
- b) Describe a procedure of chaining across a wide river when the survey line crosses the river at right angle by erecting right angles. **(8 marks)**
- c) State **SIX** characteristics of contour lines. **(6 marks)**