



## 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 2102 ENGINEERING SURVEYING 1

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.*

*-Scientific calculator*

This paper consists of five questions.

Attempt any THREE questions.

**Do not write on the question paper.**

### Question One

(a) Using sketches explain the following methods of picking details in chain surveying

- ( i ) Triangulation
- ( ii ) Trilateration ( **6 marks** )

(b) State FIVE factors considered before selecting survey stations ( **5 marks** )

(c) With the aid of a sketch, describe the procedure for ranging a line over a hill ( **9 marks** )

### Question Two

( a)With the aid of a sketch explain the procedure of ranging a line where there is an obstacle to both ranging and chaining without setting out right angles . ( **8 marks** )

(b) With the aid of a sketch briefly explain correction of an error using step chaining method ( **9 marks** )

( c ) A chain of nominal length 20m measures 20.05 m when compared with standard length. If this chain is used to measure a length AB and the measurement recorded is 131.35 m, determine the true length of line AB ( **3 marks** )

### Question Three

a ) Define the following as applied in leveling:-

- ( i) Horizontal line
- ( ii ) Datum
- ( iii ) Reduced level
- ( iv ) Bench mark
- ( v ) Spot height ( **5 marks** )

b ) Define the following terms as used in adjustments of the leveling instruments

( i ) Temporary adjustment

( ii ) Permanent adjustment ( **4marks** )

c )Briefly describe temporary adjustments of dumpy level (**11 marks** )

#### **Question Four**

(a )When checking tilting level for collimation error, the level was set up midway between two staff stations A and B, 60m apart, staff reading on A is 2.850m and on B is 1.550m. The level was then shifted to point C, 20m behind B and in line AB . Staff reading on A and B are 3.750 and 1.850 respectively.

Calculate:-

(i) The amount and direction of collimation error

(ii) The true reading on staff at A and B from C

(iii) Explain adjustment procedure for the level (**10 marks**)

b) (i) Explain the essential difference between the Automatic level and other types of levels

(ii) Explain the parallax adjustment procedure for a level (**10 marks**)

#### **Question Five**

a) Explain the following errors in leveling

(i) Defect of staff

(ii) Unstable ground (**5 marks**)

b) The following is a series of leveling observations taken in a sequence starting on a bench mark with a reduced level of 300.00m. The instrument was moved after the third, sixth and eleventh readings. 4.502, 1.928, 4.327, 0.315, 2.421, 1.519, 1.620, 3.672, 3.802, 4.925, and 0.982.

Prepare a level book form, enter the readings and reduce the readings by the rise and fall method, applying arithmetical checks (**15 marks**)