



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)
Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

DIPLOMA IN BUILDING & CIVIL ENGINEERING

DIPLOMA IN CIVIL ENGINEERING

EBC 2129: ENGINEERING SURVEYING I

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *Scientific Calculator*

This paper consists of **FIVE** questions

Answer question **ONE (COMPULSORY)** from **SECTION A** and any other **TWO** questions from **SECTION B**

Maximum marks for each part of a question are clearly shown

This paper consists of **SIX** printed pages

SECTION A (COMPULSORY)

Question 1 (30 marks)

a) (i) Define the following terms as used in leveling

- (i) Level line
- (ii) Line of collimation
- (iii) Reduced level (3 marks)

(ii) Describe the following temporary adjustment of a tilting level with a ball and socket:

- Centering the circular bubble
- Focusing and elimination of parallax
- Centering the sensitive spirit bubble (7 marks)

b) (i) Differentiate between cumulative and gross errors in chain surveying

(ii) State any **FOUR** points to be considered in the selection of station in chain surveying (8 marks)

c) The following readings were taken in sequence during a leveling exercise. 2.000, 3.437, 1.556, 2.678, **3.571**, 2.211, 1.050, **1.510**, 2.459, 1.825, **1.770**, 3.890, **2.175**, 1.775, 1.250, 0.150 and 1.278 all in metres. Given that the level was shifted after the **fifth, eighth, eleventh** and **thirteenth** readings and that the first reading was taken on a TBM of reduced level of 80.99m. Enter the readings in a height of collimation leveling booking table and calculate the reduced level of the points, applying the necessary arithmetical checks (12 marks)

SECTION B (Answer any TWO questions from this section)

Question 2

a) Define the following terms as used in chain surveying:

- (i) Chainage
- (ii) Offset
- (iii) Trilateration
- (iv) Chain surveying

b) A line was measured with steel believed to be 30.00m and found to be 258.075. However, on re-examination of the band it was found to measure only 29.75m long:

- (i) Calculate the correct length of the line
- (ii) If the band in (b) (i) above was used to measure an area and found to be 6.89 hectares, calculate the correct area (4 marks)

c) With the aid of a sketch, explain the measurement procedure of a line longer than a tape length. (10 marks)

Question 3

- a) Explain step chaining
- b) (i) List the **THREE** categories of obstacles in chain surveying giving an example of each.
(ii) With the aid of a sketch, explain the procedure of measuring a line across a wide Pond without setting out right angles (9 marks)
- c) Figure 1 shows the map of an area. Illustrate, in a double lines field book the booking of line B (7 marks)

Question 4

- a) State any **FIVE** characteristics of contours (5 marks)
- b) State any **FOUR** uses of contour maps (4 marks)
- c) Figure 2 shows the heights at the intersection of a rectangular grid for plot:
- (i) Draw by estimation the 60, 65, 70, 75 and 80m contours.
 - (ii) Calculate the position of the 60.00m contour between gridlines A and B (11 marks)

Question 5

The information shown in table 1 was obtained in a leveling exercise. Reduce the readings by the rise and fall method applying the necessary arithmetical checks. (20 marks)

BS	IS	FS	Chainages (m)	Remarks
3.670				BN NO 1 (RL = 987.89m)
	3.680		0.00	Point A
	4.680		20.00	Point B
	2.110		40.00	Point C
2.875		3.571	60.00	Point D
	3.658		80.00	Point E
	2.677		100.00	Point F
	2.290		120.00	Point G
4.600		3.053	140.00	Point H (CP)
	2.566		160.00	Point J
	1.090		180.00	Point K
3.412		2.605		
	1.563		220.00	
	2.973		240.00	
		3.095	260.00	BM No 2