



# THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

*Faculty of Engineering and Technology*

**DEPARTMENT OF BUILDING AND CIVIL ENGINEERING**

**DIPLOMA IN CIVIL ENGINEERING  
DIPLOMA IN ARCHITECTURE**

**EBC 2203: ENGINEERING SURVEYING II**

**SPECIAL/SUPPLEMENTARY EXAMINATION**

**SERIES: OCTOBER 2011**

**TIME: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer booklet*
- *Scientific calculator*
- *A set of drawing instruments*

This paper consists of **FIVE** questions

Answer question **ONE** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **FOUR** printed pages

**SECTION A (COMPULSORY)**

### Question 1

a) Differentiate between:

- (i) Partial and total co-ordinates
- (ii) True meridian and magnetic meridian
- (iii) Swinging and transiting (6 marks)

b) Explain the repetition method of measuring horizontal angles (7 marks)

c) The readings shown in table 1 refer to the measurement of several horizontal angles about a point A. Reduce the angles using a table and illustrate the configuration of the angles (6 marks)

Table 1

Inst Stn	To Stn	Face Left			Face Right		
		0	'	''	0	'	''
A	B	00	30	20	180	30	21
	C	35	42	55	215	42	56
	D	67	59	59	248	00	00
	E	175	01	07	355	01	06
	F	310	59	58	130	59	59
	B	360	30	25	180	30	20

d) Given the co-ordinates of point X and Y as;

X: 725.59mE 310.11mE  
Y: 250.10mE 565.88ME

Calculate the length and whole circle bearing of line XY using a joint computation table (5 marks)

e) Outline **THREE** uses of a theodolite (6 marks)

### SECTION B (Answer any TWO questions from this section)

#### Question 2

a) Differentiate between:

- (i) Reduced and whole circle bearings
- (ii) Partial co-ordinates and polar co-ordinates
- (iii) Rectangular co-ordinates and polar co-ordinates (6 marks)

b) Convert the following whole bearings into reduced bearings

- (i) 145°
- (ii) 315°

- (iii) 780°
- (iv) 80 ½°

(4 marks)

*Fig 1.0*  
Bold lines

- c) Figure 1 shows the uncorrected clockwise angles of a closed link traverse. Given the whole circle bearing of lines as 1A and E2 as 123° 10' 50'' and 127° 11' 08'' respectively, calculate the whole circle bearings of the other lines (10 marks)

**Question 3**

- a) The information shown in table 2 is for tachometric exercise with a telescope fitted with an annalistic telescope. The first reading was observed onto a BM of reduced level 20.57m. Calculate the following, given the height of the instrument as 1.48m and instrument constants as 100 and zero.
- (i) Distances AB, AC and BC
  - (ii) The differences in height AB, AC and BC
  - (iii) The reduced level of points C and B
  - (iv) Area ABC
  - (v) The gradient of line BC.

*Table 2*

Point	To stn	Staff readings			Vertical angle	whole angle bearings
		Upper	Mid	Lower		
A	B	1.587	1.853	2.118	0° 30' 11''	25° 30'
	C	2.078	2.593	3.107	1° 15' 00''	92° 50'

(20 marks)

**Question 4**

Fig 2.0 represents a closed polygonal traverse 123. The whole circle bearing of line 12 is 60° 00' 00''. Calculate the following for the traverse.

*Fig 2.0*

- a) Corrected internal angles
- b) The whole circle bearings of lines 23 and 31
- c) The partial co-ordinates of the lines
- d) The total co-ordinates of point 2 and 3 given those of 1 as 1000.00ME, 1000.00MN. (20 marks)

**Question 5**

- a) (i) Define the following terms as used in compass traversing
  - Secular variation
  - Diurnal variation
  - Agonic line
- (ii) State **THREE** uses of compass traverse
- (iii) State **TWO** merits and **TWO** demerits of a compass traverse (10 marks)
- b) The data of a compass traverse is as shown in table 3. Adjust the traverse for local attraction (10 marks)

*Table 3.0*

Line	Length (m)	Forward bearing	Back bearing
12	86	60°	23°
23	94	358°	182°
34	155	148¼°	329°
45	120	219°	44¼°
561	100	315¾°	136¼°