



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 & COMPUTER (DCC 09)
DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBC 09)
EBC 2322: MEASUREMENT OF CIVIL ENGINEERING WORKS

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2011

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 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 **FOUR** printed pages

SECTION A (COMPULSORY)

Question 1 (30 marks)

a) Define the following terms:

- (i) Compass traverse
- (ii) Isogonals
- (iii) Variation of declination
- (iv) Local attraction

(6 marks)

b) Table 1 shows the included angle between AB and AC. Calculate the internal included angle.

Table 1

(i)	AB	N 30°	10'E	AC	N79°	45'E
(ii)	AB	N 15°	40'E	AC	S 50°	40'E
(iii)	AB	S 45°	00'E	AC	N 45°	30'E
(iv)	AB	N 60°	30'E	AC	N 30°	25'W

c) The bearing of a closed traverse ABCDE are as shown in table 2

Table 2

Line	Forward bearing	Back bearing
AB	107° 15'	287° 15'
BC	22° 00'	202° 00'
CD	281° 30'	101° 30'
DE	181° 15'	1° 15'
EA	124° 45'	304° 45'

Compute the interior angles of the traverse and apply the necessary checks (12 marks)

d) Compute the back bearing of the following bearings.

- (i) 60° 30'
- (ii) 210° 45'
- (iii) 133° 00'
- (iv) 350° 05'

(4 marks)

SECTION B (Answer any TWO questions from this section)

Question 2 (20 marks)

a) Define the following terms:

- (i) Whole circle bearing
- (ii) Partial co-ordinates
- (iii) Polar co-ordinates
- (iv) Join

(8 marks)

- b) Outline **THREE** uses of compass traverse (3 marks)
- c) State **SIX** points to be considered when selecting station for a compass traverse (9 marks)

Question 3 (20 marks)

- a) Convert the following whole circle bearings into quadrantal bearings
- (i) $68^{\circ} 30'$
 - (ii) $210^{\circ} 00'$
 - (iii) $300^{\circ} 40'$
 - (iv) $120^{\circ} 35'$
- (4 marks)
- b) Define the following terms.
- (i) Angles
 - (ii) Bearings
 - (iii) Magnetic meridian
 - (iv) Local meridian
 - (v) Grid meridian
 - (vi) Co-ordinate system
- (9 marks)
- c) With the aid of a sketch, illustrate the construction of a prismatic compass (7 marks)

Question 4 (20 marks)

- a) The internal clockwise angles of a closed polygonal traverse are as shown in Table 3. Calculate and tabulate the corrected bearings, given the whole circle bearing of line AB as $100^{\circ} 00' 00''$

Table 3

Angle	Observed Value		
ABC	120°	$20'$	$00''$
BCD	86°	$00'$	$40''$
CDE	341°	$34'$	$20''$
DEF	60°	$22'$	$00''$
EFA	100°	$22'$	$20''$
FAB	11°	$14'$	$10''$

(12 marks)

- b) Table 4 shows the datum co-ordinates of points T1 and T2

Table 4

T ₁	1673.1ME,	1377.6mN
T ₂	1477.8ME,	1106.9mN

Compute the distance and bearing of T₁ – T₂ (6 marks)

- c) State any **TWO** merits of compass traversing (2 marks)

Question 5 (20 marks)

- a) Table 5 shows magnetic bearings in which is expected a local attraction presence. Use the readings to calculate the bearings corrected for local attraction (15 marks)

Line	Forward bearing	Back bearing
AE	319° 00'	135° 30'
AB	72° 45'	252° 00'
BC	349° 00'	167° 15'
CD	298° 30'	118° 30'
DE	229° 00'	48° 00'

- b) State the conversion of the forward bearing of a line into its back bearing in Quadrantal bearing system (5 marks)