TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

CERTIFICATE IN BUILDING & CIVIL ENGINEERING (CBCE)

EBC 1203: ENGINEERING SURVEYING II

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: OCTOBER/NOVEMBER 2013
TIME ALLOWED: 2 HOURS

<u>**Instructions to Candidates:**</u>
You should have the following for this examination
-   *Answer Booklet*
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 **FOUR** printed pages

Question One

a) (i) State any THREE uses of a compass traverse. (3 marks)
(ii) Differentiate between the following pair of terms:
- Isogonals and Agonic line
- Secular and Diurnal variation (4 marks)

(iii) State any TWO demerits of a compass traverse (2 marks)

b) Table 2 shows the data for a compass traverse. Adjust the traverse for local attraction (11 marks)

Table 1

Line	Length	Forward Bearings	Back Bearing
AB	21.09	207 ¾°	29°
BC	14.60	135 1/4°	315 ¼°
CD	16.16	62°	242 ¼°
DE	15.27	12°	192 ¼°
EA	20.22	292°	112 ½°

Question Two

a) (i) Differentiate between tangential and stadia tacheometry.
(ii) Define tacheometry
(iii) State the basic quantities from which horizontal distance are derived in tacheometry.
(4 marks)
b) The data for a stadia tachometric survey is as shown in table 2. The theodolite was fitted with an analatic telescope and had multiplying constant of 100. Given the reduced level of point J as 275.91m, calculate:-
(i)   Distance JK, JL and KL
(ii)   Area JKL
(iii)   Reduced levels of points K and L (16 marks)

Table 2

Inst Stn	To Stn	Staff Readings			Height of Instrument	Vertical circle readings	Whole circle readings
J	K	2.750	2.100	1.570	1.53	2° 00'	60° 30'
	L	3.050	2.153	1.253	1.49	-2 50'	130° 40'

Question Three

a) (i) State the aim of the following permanent adjustments of a theodolite
   - Plate bubble error
   - Trunnion axis error   (2 marks)

   (ii) State the function of the following parts of a theodolite:

   - Horizontal circle
   - Vertical circle
   - Telescope
   - Vernier   (4 marks)

b) Describe the collimation error adjustment of a theodolite.   (8 marks)

Question Four

a) Derive the basic stadia formula.   (8 marks)

b) The information of a tangential tacheometric exercise is as shown in table 3.

Inst Stn	To Stn	Vertical Circle Reading	Start Reading	Horizontal Circle Reading	Height of Instrument
P	Q	3º 00' 4º 52'	1.751 4.250	20º 00' 00"	54
	R	2º 15' 3º 45'	1.250 3.68	92º 50' 10"	1.50

Calculate:
(i)   Distance PQ, PR and QR
(ii)   Area PQR
(iii)   Reduced levels of points Q and R given that P as 125.00m

Question Five

a) Differentiate between the following pair of terms:
   - Back bearing and forward bearing
   - Magnetic meridian and true meridian   (4 marks)

b) Table 4 shows the uncorrect internal angles of a closed polygonal traverse PQRSTUP. Calculate the corrected whole circle bearings of lines QR,RS, ST, TU and UP given that of line PQ as 155º 51' 55"
                                                                               (10 marks)

Table 5

K: 271.050mE   0.578mN

P: 100.225mE   81.580mN   (6 marks)

Line	Length (mm)	Uncorrected Interval angles
PQ	66.71	89º 34' 30"
QR	63.82	148º 01' 19"
RS	64.15	104º 51' 40"
ST	63.71	129º 08' 30"
TU	64.28	112º 06' 40"
UP	63.90	141º 17' 20"

Fig 1