TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE 13M)

EBC 2203: ENGINEERING SURVEYING II

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2013
TIME ALLOWED: 2 HOURS

Instructions to Candidates:
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) Define the following terms as used in a coordinate system:
   (i) True meridian
   (ii) Magnetic meridian
   (iii) Whole circle bearing
   (iv) Partial coordinates **(4 marks)**

b) Given the coordinates of point T and R as
   T: 205.15mE, 705.22mN
   R: 700.00mE,100.00mN

   Calculate the length and the bearing of line RT. Use a join computation table. **(7 marks)**

c) Figure 1 shows the lengths and the un-corrected internal angles of a closed polygonal traverse ABCDA. Given the whole circle bearing of line AB as 8^{o} 4' 09" calculate:

   (i) The corrected angles
   (ii) The whole circles bearing of lines

   BC, CD and DA **(9 marks)**

   388.38m

Question Two

a) State the aim and necessity of the following permanent adjustments of a theodolite:
   (i) Collimation error
   (ii) Diaphragm error adjustments **(4 marks)**

b) Describe the bubble error adjustments of a theodolite. **(8 marks)**

c) The readings shown in table 1 were recorded in the measurement of several angles about a point. Reduce the angles and illustrate the configuration of the angles in a sketch. **(8 marks)**

Instrument Station	To Station	Face left	Face right
		o ‘ “	o ‘ “
A	B	5 00 15	185 00 16
	C	36 40 25	216 41 00
	D	75 26 20	255 30 25
	E	181 46 22	01 46 27
	F	256 57 03	76 51 01
	A	365 00 01	185 00 02

Question Three

a) Differentiate between:
- **(i)** Isogonals and Agonic line
- **(ii)** Magnetic declination and magnetic north
- **(iii)** Local attraction and Diurnal variation **(6 marks)**

b) Table 2 shows the observed bearings of a campass traverse ABCDA. Adjust the bearings for local attraction. **(14 marks)**

Table 2

Line	Forward Bearing	Back Bearing
	o ‘	o ‘
AB	44 40	255 20
BC	96 20	274 18
CD	30 45	212 25
DA	320 25	140 25

Question Four

a) State ONE merit and TWO demerits of the tangential systems of tacheometry over the stadia system. **(4 ½ marks)**

b) The data of a tangential tacheometric exercise is as shown in table 3. Given the reduced level of point P as 715.271m, calculate
- (i) Distances PQ, PR and QR
- (ii) The difference in height PQ
- (iii) The reduced levels of point P and Q
- (iv) Area PQR in hectares. **(15 ½ marks)**

Inst	To	Staff Readings	Vertical Angles	Height of Inst	Whole Circle

Stn	Stn				Bearing
			o ‘		o ‘
P	Q	1.850 0.420	3 45 1 50	1.46	25 00
	R	2.010 0.675	2 30 1 10	1.46	140 00

Question Five

a) Derive the basic stadia formula **(6 marks)**

b) Table 4 shows the whole circle bearings of a line traverse ABCDF calculate the clockwise angles at B, C and D and illustrate configuration of the traverse in a sketch.

Line	Whole Circle Bearing		
AB	224º	30’	40”
BC	55º	20’	10”
CD	170º	40’	40”
DE	35º	10’	25”

c) Derive an equation for horizontal distance in tangential tacheometry **(5 marks)**