TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE 14)

EBC 2106: ENGINEERING SURVEYING II

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2014
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 of the **FIVE** questions
All questions carry equal marks
Maximum marks for each part of a question are as shown
Use neat, large and well labeled diagrams where required.

This paper consists of **FOUR** printed pages

Question One

a) Define the following terms as used in a co-ordinate system:
- **(i)** Co-ordinate system
- **(ii)** Polar co-ordinates
- **(iii)** Rectangular co-ordinates
- **(iv)** Partial co-ordinates **(4 marks)**

b) The information shown in figure 1 and table 1refer to a line traverse ABCDEFG. Calculate the clockwise angles at B, C, D and E **(8 marks)**

Table 1

Line	**Length**	**Whole Circle Bearings**
	(m)	**º ‘ “**
AB	507.22	42 20 40
BC	680.96	127 40 30
CD	310.22	198 42 25
DE	450.78	115 10 10
EF	390.75	35 50 50
FG	420.25	326 18 17

Figure 1

c) Given the co-ordinates of points Q and R as 205.867mE, 107.251m N and 115.67mE, 310.251mN respectively. Calculate the length and bearing of line QR using a join computation table. **(8 marks)**

Question Two

a) Differentiate between the following pair of terms as used in theodolite traversing:
- **(i)** Open traverse and closed traverse
- **(ii)** Control station and traverse leg. **(4 marks)**

b) The data shown in table 2, is for a closed polygonal traverse P,Q,R,T,P. Given the co-ordinates of point P as 2500.00mE and 3050.00mN calculate the co-ordinates of points Q,R,S and T adjusting for any misclosure by the Transit method. **(16 marks)**

Table 2

Line	Length	Partial Eastings (m)	Partial Northings (m)
PQ	194.83	+25.878	-193.106
QR	231.94	+230.859	+22.509
RS	202.83	-22.508	+201.580
ST	226.84	-190.126	-123.726
TP	128.61	-89.118	+92.755

Question Three

A circular curve 315m radius is to be set out to connect two straights deflecting at an angle of 30º. The chainage of the intersection point is +2156.00m. Given that the curve is to be set out by the theodolite and tape method for 20m standard chords, calculate the setting out data for the curve. **(20 marks)**

Question Four

Table 3 shows the information obtained in a stadia tacheometric exercise. Given the height of the instrument as 1.48m and the reduced level of the instrument station as 305.00m, calculate the following:

(i) Distances AB, BC and AC
(ii) Area ABC in hectares
(iii) The reduced levels of point B and C
(iv) The gradient of line AB **(20 marks)**

Inst Stn	**To Stn**	**Vertical Circle Readings**	**Staff Readings**			**Whole Circle Bearings** º ‘ “
A	B	2º 40’	2.570	3.275	3.975	310 40 20
	C	-1º 50’	1.005	1.957	2.907	185 20 10

Question Five

The information shown in table 4 and figure 2 is for a close link traverse JKLM. Calculate the co-ordinates of points K and L by the Bowditch’s method given the dutum co-ordinates and bearings as:

Datum bearing	Datum Co-ordinate	
JK: 133º 29’ 33”	J: 1000.00mE,	1000.00mE
LM: 327º 33’ 41”	M: 1467.35mE	1178.76mE

Table 1

Line	Length (m)	Angle	Point
J.K	392.55		J
KL	395.34	106º 30’ 28”	K
LM	297.94	87º 33’ 48”	L

Figure 2