TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE 14J)

EBC 2102: ENGINEERING SURVEYING I

END OF SEMESTER EXAMINATION
SERIES: APRIL 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
This paper consists of **THREE** printed pages

Question One

a) Differentiate between the following pair of terms:
(i) Plane surveying and Geodetic surveying
(ii) Land surveying and engineering surveying. **(4 marks)**

b) (i) Given the human eye can estimate a right angle to $\pm 3^{o}$ and that the smallest line that is capable of being plotted on paper is 25mm, calculate the maximum length of offset that can be estimated by eye for a scale of map of 1:2500. **(3 marks)**

(ii) The data shown in table 1 is for the measurement of a line in two bays. Calculate the correct length of the line:

Bay	Measured length (m)	Standard Temperature	Field Temperature	Angle of Slope	Coefficient or Linear expansion
A	52.573	20^{o}	32^{o}C	7^{o}	0.000011^{o} C
B	68.914	20^{o}C	33.5^{o}C	12^{o}	0.000011^{o}C

(8 marks)

c) With the aid of a sketch, explain the measurement procedure of a line across a marshy ground without setting out right angles. **(5 marks)**

Question Two

With the aid of sketches, determine the following chain surveying procedures:

a) Measuring a line over a small hill by the random line method. **(6 marks)**
b) Measuring a line across a tall building by setting out right angles **(7 marks)**
c) Measuring a line across a wide road **(7 marks)**

Question Three

a) State any FIVE properties of contour lines **(5 marks)**

b) Explain any FOUR factors that govern the choice of vertical interval in contouring. **(4 marks)**

c) Figure 1 shows the spot height at the intersection of a rectangular grid. Redraw the grid and by estimation, interpolate and plot the 32, 34, 36 and 38mm contours. **(6 marks)**

44.50

d) Differentiate between the following terms:
   (i) Contour interval and horizontal equivalent
   (ii) Longitudinal section and cross-sections **(5 marks)**

Question Four

a) (i) Differentiate between permanent and temporary adjustment of a level. **(3 marks)**

(ii) Describe the bubble error adjustment of a dumpy level **(8 marks)**

b) The following data was obtained during a leveling exercise along the length of a proposed road: 2.578, 2.675, 2.481, 2.351, 2.590, 2.688, 2.775, 2.970, 3.850, 3.922, 4.224, 4.000, 3.750, .3270, 3.500, 3.211 all in metres. The telescope was first sighted on a TBM of reduced level of 287.581m and the instrument was shifted after the 3rd, 6th, 10th and 14th staff readings. Reduce the levels by the height of collimation method applying the necessary arithmetical checks.

Question Five

a) Explain the radial lines method of contouring. **(6 marks)**

b) Explain the procedure of measuring vertical angles with a theodolite. **(7 marks)**

c) The readings shown in table 2 were recorded during the measurement of several angles about a point. Reduce the angles using an angular booking table and illustrate the configuration. **(7 marks)**

Table 2

Inst Stn	To stn	Face Left	Face Right
		o ‘ “	o ‘ “
A	B	06 10 10	180 10 13
	C	60 50 20	240 50 22
	D	175 24 14	355 24 15
	E	282 11 12	102 11 10
	F	300 05 07	120 05 08

	A	366 10 12	186 10 15	