



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

Department of Building & Civil Engineering

UNIVERSITY EXAMINATION FOR DIPLOMA IN:

DIPLOMA IN CIVIL ENGINEERING

DIPLOMA IN BUILDING AND CIVIL ENGINEERING (DBCE 15S)

EBC 2105: ENGINEERING SURVEY II

END OF SEMESTER EXAMINATION

SERIES: MAY 2016

TIME ALLOWED: 2 HOURS

Instruction To Candidates:

You should have the following for this examination;

- *Answer booklet*
- *Pocket calculator*

*This paper consists of FIVE questions. Answer ANY **THREE** questions.*

Maximum marks for each part of a question are as shown



SGS ISO 9001:2008 Certified

QUESTION 1

(a) State FOUR uses of a theodolite (2 mark)

(b) Define the following terms as applied to theodolite work

(i) Vertical axis

(ii) Collimation axis

(iii) Centering

(iv) Face left

(v) Transitting

(5marks)

(c) State the procedure of leveling a theodolite

(6marks)

(d) Table 1 shows horizontal circle readings about a point. Reduce the angles using an angular booking table and illustrate the configuration of the station (7 marks)

Table 1

Inst. station	To point	Face left	Face right
Y	A	012° 16' 00''	192° 16' 20''
	B	043° 39' 20''	223° 40' 20''
	C	141° 06' 20''	321° 07' 40''
	D	207° 53' 40''	027° 54' 20''
	A	012° 16' 20''	192° 17' 20''



QUESTION 2

(a) A theodolite was set up at station X and observations made to point Y1 and Y2 as shown in table 2

Table 2

Inst. Station	To point	Horizontal Reading	Vertical Reading	Staff reading		
				lower	Middle	upper
	Y1	293° 32' 41''	+3° 00' 30''	1.000	1.530	2.060
	Y2	23° 32' 41''	-2° 30' 20''	1.180	1.570	1.960

Assuming that the theodolite was fitted with anallactic lenses:-

- (i) Determine the horizontal distances Y1 and Y2 from instrument station X.
- (ii) Determine the horizontal distance Y1 – Y2.

(10 marks)

(b) Differentiate between the following:-

- (i) Angle and bearing
- (ii) Reduced bearing and whole circle bearing

(4 marks)

(c) State any :-

- (i) Two uses of a compass traverse
- (ii) Two merits of compass traverse
- (iii) Two demerits of compass traverse

(6 marks)

QUESTION 3

(a) Calculate the interior angles of the traverse shown in table 3

Table 3

Line	Fore bearing
AB	70°30'
BC	132°00'
CD	65°00'
DE	215°30'
EA	310°00'

(10 marks)

(b) Define the following terms:-

(i) Magnetic meridian

(ii) Arbitrary meridian

(iii) Local attraction

(6 marks)

(c) Convert the following whole circle bearing to quadratic bearings:-

(i) $335^{\circ}40'$

(ii) $160^{\circ}20'$

(iii) $200^{\circ}30'$

(iv) $45^{\circ}20'$

(4 marks)

QUESTION 4

(a) The following data in table 4 refer to a closed link traverse PQRS.

Table 4

Line	Length(m)	Corrected WCB
PQ	500.78	$150^{\circ}40'20''$
QR	60.39	$140^{\circ}30'20''$
RS	290.98	$305^{\circ}40'20''$
ST	568.06	$104^{\circ}40'10''$

Given datum co-ordinates:-

P 2500.00mE , 2000.00mN

T 3097.00mE , 1543.10mN

Compute the total coordinates of points Q,R and S adjusting any misclosure by the Bowditch's method. (20 marks)

QUESTION 5

A circular curve; 415.00m radius is to be set out to connect two straights deflecting at an angle 24° . Given the chainage of the intersection point as 10007.00m and the curve is to be set out by the theodolite and tape for continuous chainage basis. Calculate the data for setting out the curve. (20 marks)

