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

1.(a) Define the following terms as used in theodolite work:

i. Vertical axis
ii. Transiting
iii. Face left
iv. Centering
v. Collimation axis (5 marks)

(b) State FOUR uses of a theodolite (2 marks)

(c) **Table 1** below shows horizontal circle readings about a point. Reduce the angles using an angular booking table and illustrate the configuration of the stations on a sketch.

(6 marks)

Table 1

Instrument at	**To point**	**Face left**	**Fact right**
Y	A	12° 16′ 00″	192° 16′ 20″
	B	43° 39′ 20″	223° 40′ 20″
	C	141° 06′ 20″	321° 07′ 40″
	D	207° 53′ 40″	27° 54′ 20″
	A	12° 16′ 20″	192° 17′ 20″

(d) The data shown in table 2 is for a closed polygonal traverse. A, B, C, D, A. Given the co-ordinates of point A as 2000.000mE, 4000.000mN. Calculate the co-ordinates of points B and C. (7 marks)

Table 2

Point	Eastings(m)	Northings (m)	Length (m)
A	+600.000	-520.500	794.31
B	+152.178	+650.200	667.77
C	-205.790	-205.118	294.10
D	-546.394	-339.810	643.44

QUESTION TWO

(a) (i) Define the term tacheometry.

(ii) Differentiate between stadia and tangential tacheometry. (3 marks)

(b) Shown in table 3 is the data for stadia tacheometric survey with the staff held vertically. The additive and multiplying constants of the tacheometer were 0 and 100 respectively. The reduced level of point A was 300.000m.

Calculate (i) the distance A B

(ii) The reduced level of point B (7 marks)

Table 3

Inst station	**To station**	**Ht of Inst.**	**Vert. Angle**	**Staff Readings in mm**		
				Upper	Middle	Lower
A	B	1.45	+2° 15′ 00″	3.550	2.728	1.906

(c) Given the co-ordinates of X: are +536.2mE, +254.6mN and those of Y are: +206.3mE, +473.9mN.

Calculate the length and the whole circle bearing of line XY (6 marks)

(d) (i) State any TWO uses of a compass traverse

(ii) State any TWO advantages of compass traversing (4 marks)

QUESTION THREE

(a) Define the following terms as used in compass traversing

(i) Diurnal variation

(ii) Agonic line

(iii) Local attraction

(iv) Magnetic meridian (6 marks)

(b) Compute the back bearing of the following:-

(i) 040°15′

(ii) 210° 00′

(iii) 130°30′

(iv) 335°20′ (4 marks)

(c) Briefly explain the following methods of measuring horizontal angles using theodolite

(i) Reiteration

(ii) Repetition (10 marks)

QUESTION FOUR

The deflection angle between two straights of a road to be connected by a circular curve is 50°. If the curve radius is to be 160.000m while the chainage at the intersection point is +750.000m.

Calculate the following:-

(i) The tangent length

(ii) The length of the curve

(iii) The initial and the final chord length if the standard chords are to be 20m by through chainage.

(iv) The tangent angles for setting out the curve.

(20 marks)

QUESTION FIVE

(a) Define the following terms as applied to mass haul diagram :-

(i) Haul

(ii) Haul distance

(iii) Borrow

(iv) Waste (6 marks)

(b) (i) State any FIVE properties mass haul diagram.

(ii) Differentiate between shrinkage and bulking as used in earthworks. (14 marks)