DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY

UNIVERSITY EXAMINATION 2020

MODULE I & II EXAMINATION FOR THE DIPLOMA IN BUILDING TECHNOLOGY

TBT0112 SURVEYING I

DATE: April 2020 **TIME: 2HOURS**

Instructions: ATTEMPT QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION 1 [30 Marks]

a) Explain 2 advantages of electromagnetic distance measurement as compared to traditional chain surveying. (4 marks)

b) State five functions performed by a total station. **(5 marks)**

c) Discuss the role of surveying in the construction industry. **(5 marks)**

d) Table 1 below show results from a closed leveling fieldwork. Fill the table and reduce the levels. Check the levels and adjust the error(s) if any appropriately. (10 marks)

Table 1

BS	**IS**	**FS**	**Rise**	**Fall**	**Reduced Level**	**Remarks**
1.944					452.000	BM 1
	1.691					O m
	2.009					20 m
0.367		2.842				40 m
	1.223					60 m
	1.347					80 m
2.114		0.775				100 m
		0.816				BM 1

e) Given the following horizontal angles observed from a link traverse, calculate the corresponding whole circle bearings (WCB) for the lines B – E1, E1 – E2, E2 – E3, E3 – E4, E4 – C, and C – D. **(6 marks)**

Stns	Observed angles ° ' "	Line	WCB ° ' "
A		*A - B*	*151 27 38*
B	*143 54 47*	*B – E1*	
E1	*149 08 11*	*E1 – E2*	
E2	*224 07 32*	*E2 – E3*	
E3	*157 21 53*	*E3 – E4*	
E4	*167 05 15*	*E4 - C*	
C	*74 32 48*	*C - D*	

QUESTION 2 **[15 Marks]**

a) Describe the following types of survey stations: **(3 marks)**
   i. Main stations
   ii. Subsidiary or tie stations

b) Differentiate between polar and join computations. **(4 marks)**

c) The following are notes from a closed traverse survey of an abandoned quarry. Compute the traverse station coordinates of stations (B, C, D and E) given the coordinates of point A as (Northings=1000 m, Eastings=2000 m). **(8 marks)**

Line	**Horizontal length (m)**	**Whole Circle Bearing**
At station A B	120	9° 12’
At station B C	240	127° 30’
At station C D	360	185° 40’
At station D E	420	258° 20’

QUESTION 3 **[15 Marks]**

a) Using an illustration, differentiate between Geographic coordinate system and Plane rectangular coordinate system. (2 marks)

b) Differentiate between Gross, Systematic and Random errors in surveying measurements. (3 marks)

c) An open traverse with points A, B, C, D, E was carried out and closed at A (known station). Calculate the linear departures, latitudes and the linear misclosure and relative precision of the traverse. Balance the departures and latitudes using the Bowditch (compass) rule given that the coordinates of A are 10,000.00 m and 5,000.00m Easting and Northing respectively. **(10 marks)**

Station	Preliminary azimuths	**Length (m)**
A	126°55’17”	647.25
B	178°18’58”	203.03
C	153° 1’54”	720.35
D	284° 35’20”	610.24
E	206° 09’42”	285.13

QUESTION 4 **[15 Marks]**

a) Differentiate between Traversing and Resection methods of fixing positions in the horizontal planes. **(2 marks)**

b) Using appropriate illustrations, differentiate between the following kinds of horizontal angles most commonly measured in surveying. **(5 marks)**
   i) Interior angles.

ii) Angles to the right.
iii) Deflection angles.
iv) Bearing
v) Azimuth

c) Explain four general phases of a topographical survey. (8 marks)

QUESTION 5 **[15 Marks]**

a) Define the term “level datum”. (1 mark)
b) Describe the following methods of levelling: (6 marks)
   i. Differential levelling
   ii. Reciprocal levelling
   iii. Trigonometric levelling
c) Explain four uses of Levelling. (8 marks)