KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR

SECOND YEAR FIRST SEMESTER
SPECIAL/SUPPLIMENTARY EXAMINATIONS

FOR THE DEGREE OF
B.SC RENEWABLE ENERGY AND BIOFUELS TECHNOLOGY

COURSE CODE: REN 216

COURSE TITLE: ENGINEERING SURVEYING

DURATION: 2 HOURS

DATE: 22/07/2022 **TIME: 2:00PM-4:00PM**

INSTRUCTIONS TO CANDIDATES

(i) Answer **Question 1 (Compulsory)** and any other **TWO** questions
(ii) All symbols have their usual meaning

This paper consists of **4** printed pages. Please Turn Over

QUESTION ONE (Compulsory) – 30 MARKS

a) Differentiate between the following.

(i) Leveling and Traversing

(4 Marks)

(ii) Latitude and Departure

(4 Marks)

(iii) WCB and RB

(4 Marks)

b) Differentiate between the following.

i. Backsight and Foresight

(2 Marks)

ii. Accuracy and Error of closure

(5 Marks)

c) Give the formulae and define the terms therein for the following steel tape corrections.

i. Sag

(4 Marks)

ii. Tension

(4 Marks)

d) State three uses of leveling

(3 Marks)

QUESTION TWO – 20 MARKS

A nominal distance of 30m was set out with a steel tape from a mark on top of one peg to a mark on the top of another, the tape being in catenary under a pull of 220N and at a mean temperature of 17^{0}C. The top of one peg was 0.68m below the top of the other, which was 250.00m above mean sea level.

The tape, which was standardized in catenary under a pull of 178N and at a temperature of 20^{0}C, had a mass of 0.026 kg/m and a cross-sectional area of 3.25mm^2. The coefficient of linear expansion is $9\times10^{-7}/^0$C, E is 155 kN/mm^2, and R is 6370 km.

Determine the horizontal distance between the marks on the two pegs, reduced to mean sea level.

(20 Marks)

QUESTION THREE – 20 MARKS

Given below are the field notes made during a leveling for the construction of a road. Certain figures have been obliterated from the booking. However, sufficient data remains to make it possible to complete the booking.

B.S.	I.F.S.	F.S.	Rise	Fall	R. L. (m)	Distance (m)	Remarks
2.841					60.000	0.00	At A
			0.236		60.236	15.00	
	2.872					30.00	
			0.553			45.00	
		2.810		0.491		60.00	
	1.021			0.115		75.00	At B
	0.378					90.00	
				1.599		105.00	
1.426		2.773		0.796	58.164	120.00	
			0.689		58.853	135.00	
	2.103					150.00	
			0.866			165.00	At C
5.173		**6.820**					

a) Copy the figures to your answer and insert the missing values **(15 Marks)**

b) Calculate the gradient from A to C which is a straight line **(5 Marks)**

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QUESTION FOUR

A plot of land is up for sale and there is some doubt about its area. As a quick check, a compass traverse is run along the boundaries. The following data, having unadjusted latitudes and departures, was recorded.

Line	Latitude	Departure	Line	Latitude	Departure
AB	−510	−137	EF	+754	−230
BC	+048	−546	FG	+651	+057
CD	−812	−035	GH	+235	+1402
DE	−191	−1279	HA	−168	+760

Apply the unadjusted data directly to determine the area enclosed by the traverse using the Co-ordinate method.

(20 Marks)