TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2202 : ENGINEERING SURVEY I

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE:

<u>**Instructions to Candidates**</u>
You should have the following for this examination
    -Answer Booklet, examination pass and student ID
    -Drawing instruments.
This paper consists of five questions.
Attempt any THREE questions.
Do not write on the question paper.

Question ONE (Compulsory)

a). Giving appropriate formulae, state **ANY** four major corrections that are applied to a steel band when taking linear measurements. A steel band of 30 m which has been standardized in a catenary at a tension of 70 N and at a temperature of 20 ^{0}C was used to measure a 40 m bay of a baseline. The following data was recorded:

- Temperature in the field = 15 ^{0}C
- Measured length = 30 m
- Applied tension = 44.5 N
- The radius of Earth's curvature = 6370 Km
- The differences in height between the two points = 0.50 m
- The altitude of the base = 1600 m above sea level
- Cross sectional area of the tape = 5.0 mm^2
- Young Modulus of Elasticity (E) = 2.1*10^{11} N/mm^2
- Coefficient of Linear Expansion (α) = 11 *10^{-6}/^{0}C
- Mass of the tape = 1.5 Kg

Determine the correct length of the bay reduced to mean sea level (18 Marks).

b). Discuss Pythagorean Theorem as applied in the setting out of right angles to an object (9 Marks).

c). What is an offset (3 Marks).

Question TWO

a). Determine the levels of bore holes of A, B and C from the table given below (10 Marks).

B.S	I.S.	F.S	Rise	Fall	R.L	Distance (m)	Remarks
3.260					**124.560**	0	**B.M**
3.710		0.130				20	C.P
	0.920					40	Borehole A
	3.420					60	Borehole B
1.900		4.470				80	Borehole C
		3.270				100	**B.M 1**

b). Discuss ANY two methods of overcoming an obstructions that may appear in the line of survey during the process of linear measurements (10 Marks).

Question THREE

a).   With an aid of a sketch, explain the parts of a tilting level   (10 Marks).

b).   Using an interval of 1.00 m, plot contour using the spot heights given in the table below (10 Marks).

79.0	79.10	80.1	80.4	80.3	80.2	
79.30	79.20	80.6	80.8	81.6	81.7	
80.6	80.5	80.8	81.5	82.3	81.8	80.6
80.8	84.4	81.6	82.6	82.7	81.7	81.6
81.3	81.6	82.6	83.1	84.1	81.5	81.4
X_0	X_{20}	X_{40}	X_{60}	X_{80}	X_{100}	X_{120}

Question FOUR

a).   Discuss factors that must be considered when conducting reconnaissance survey during the process of linear measurements   (10 Marks).

b).   Discuss reciprocal levelling   (10 Marks).

Question FIVE

a).   Show that the formula for curvature and refraction is given by:

$$C\&R = 0.0785L^2 - \frac{1}{7}(0.0785L^2) = 0.0673L^2$$

Where C& R is the curvature and refraction and L is in Kilometers   (10 Marks).

b). i). Define the following terms as used in contour mapping:
- Contour line   (2 Marks).
- Contour interval   (2 Marks).
- Horizontal Equivalent   (2 Marks).
- Contour Gradient   (2 Marks).
ii). Mention any two uses of a contour map   (2 Marks).

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