



TECHNICAL UNIVERSITY OF MOMBASA
**Faculty of Engineering &
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR BACHELOR OF SCIENCE IN CIVIL
ENGINEERING (BSCE)

ECE 2202: ENGINEERING SURVEYING I

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2013

TIME ALLOWED: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- Answer Booklet

This paper consists of **FIVE** questions.

Answer question **ONE (COMPULSORY)** in section **A** and any other **TWO** questions from section **B**

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

SECTION A

Question One (Compulsory)

- a) Stating the appropriate formulae, explain any **FOUR** major corrections applied on a steel tape during linear measurements. A 30m steel tape, standardized at 20°C using a tensile force of 70N had a mass of 0.024kg and a cross-sectional area of 1.29mm². The tape was measured against a standard tape, and the tested tape had a length of 29.988m. The field length being measured using this tape was found to have been 29.733m at a temperature of 30°C using a tensile force of 50N. Find the actual length of the distance in question. Other details provided were:

α

- (i) Linear co-efficient of expansion () = $1.17 \times 10^{-5}/^{\circ}\text{C}$
- (ii) Young modulus of Elasticity, $E = 2.068 \times 10^{11}/\text{M}^2$
- (iii) Cross-sectional area of the tape = $1.69 \times 10^{-6}\text{mm}^2$

- (iv) The difference in height between two supports = 0.52m
 (v) The radius of Earth = 6370km
 (vi) The altitude of the area = 400m asl (16 marks)

- b) Explain the following types of surveys:
 (i) Geodetic surveying
 (ii) Cadastral surveying
 (iii) Hydrographic surveying (6 marks)
- c) What factors should you consider in choosing survey stations? (8 marks)

SECTION B (Attempt any TWO questions)

Question Two

- a) Outline FIVE characteristics of contours. State where contouring is applied. (10 marks)
- b) Explain any THREE categories of errors in leveling. (10 marks)

Question Three

- a) The following figures were extracted from a level field book, some of the entries were illegible due to exposure to rain. Insert the missing figures and carryout arithmetic check. (10 marks)

S	IS	FS	H.of Inst	RL	Remarks
?			279.0 8	277.6 5	OBM
	2.01			?	
	?			278.0 7	
3.37		0.4	?	278.6 8	
	2.98			?	
	1.41			280.6 4	
			?	281.3 8	TBM

- b) Discuss reciprocal leveling as used in survey. (10 marks)

Question Four

- a) In leveling, across a river, the following observations which gave the following results for staffs held vertically at point X and Y from level station A and B on each bank respectively:

Staff reading of X from A	=	1.853m
Staff reading of X from B	=	3.080m
Staff reading of Y from A	=	3.550m
Staff reading of Y from B	=	3.895m

If the R.L of X was 100.37 AOD, obtain the R.L of Y. (4 marks)

b) Explain the following terms:

- (i) Vertical sectioning
- (ii) Vertical interval
- (iii) Contour line
- (iv) Horizontal interval

(8 marks)

c) Discuss the procedure of carrying out TWO PEG test

(8 marks)

Question Five

a) What is the importance of vertical sections? Given the table below, and using any suitable scale, draw a longitudinal section of the profile by calculating the cut and fill in metres. **(20 marks)**

Chainage (m)	Surface Level (m)	Proposed Level (m)	Cut (m)	Fill (m)
A 0	82.978			
No1. 20	82.825			
No2. 40	82.481			
No3. 60	82.268			
No4. 80	82.000			
No5. 100	81.997			
No6. 120	81.804			
No7.140	81.674			
No8. 160	81.255			
No9.180	81.008			
B 187	80.930			

Note: The gradient of channel AB = 1 in 100