



THE TECHNICAL UNIVERSITY OF MOMBASA

# Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

**UNIVERSITY EXAMINATION FOR:**  
BACHELOR OF SCIENCE IN BUILDING & CIVIL ENGINEERING

ECE 2202: ENGINEERING SURVEYING I

**SPECIAL/SUPPLEMENTARY EXAMINATION**

**SERIES: FEBRUARY 2012**

**TIME: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- Answer Booklet
- Scientific Calculator

This paper consists of **FIVE** questions.

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

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**Question One (Compulsory)**

- a) Outline any **TWO** main types of obstacles encountered in chain surveying giving remedial measures to overcome them in each case. **(5 marks)**
- b) State and briefly explain **THREE** main errors encountered by surveyor when carrying out a chain survey. **(10 marks)**
- c) In a reciprocal leveling operation across a river the following staff readings were recorded.  
Level at A, reading on staff C =  $x = 2.46\text{m}$   
Level at A, reading on staff D =  $x_1 = 1.28\text{m}$   
Level at B, reading on staff C =  $y_1 = 3.45\text{m}$   
Level at B, reading on staff D =  $y = 2.23\text{m}$

Determine the true difference in level between point C and D

(5 marks)

X

- d) With an appropriate illustration draw an image formed by object lense on them show the focus length, lens, image magnitude and image distance. Consider also an inverted image. (10 marks)

### Question Two

- a) Define the term chain survey and hence establish:
- (i) **FOUR** equipment for linear measurement.
  - (ii) **FOUR** equipments for marking out
  - (iii) **FOUR** equipment used for setting out angles. (15 marks)
- b) Outline any **TWO** types of obstacles encountered in chain surveying giving remedial measures to overcome them. (5 marks)
- c) In chain survey errors may result from many causes. State and explain errors encountered when carrying out a chain surveying. (10 marks)

### Question Three

- a) A survey line was measured with a steel tape believed to be 50m and found to be 4500m. However, on further examination of the tape it was found out that it was measuring 50.12m. Given:
- (i) The coefficient of linear expansion =  $11.25 \times 10^{-6}$  per °C
  - (ii) Young modulus = 200KN/mm<sup>2</sup>
- Calculate:
- (i) The correct length of line if the day's temp was 35°C and the tape was standardized at 20°C
  - (ii) The correct area if the area measured by the same tape was found to be 5 hectors (10 marks)
- b) Explain the following terms as used in linear measurement:
- (i) Offsets
  - (ii) Reconnaissance survey
  - (iii) Survey lines
  - (iv) Good measuring conditions
  - (v) Laying out a chain (10 marks)

### Question Four

- a) Define the following terms as used in leveling:
- (i) Precise levels
  - (ii) Auto set levels
  - (iii) Foresight
  - (iv) Back sight

(v) Intermediate sight (5 marks)

b) With a well elaborated illustration describe a stanely dumps level used in leveling. (10 marks)

c) Carefully elaborate the steps followed when setting a dumpy level on a tripod stand. (5 marks)

### Question Five

a) The following staff readings are taken from a level book. Reduce the levels by the rise and fall method and carry out the routine arithmetical checks on the completed entries.

BS	IS	FS	Remarks
1.32			Peg A
	2.43		Peg B
	1.15		Peg C
	1.72		Peg D
5.06		1.22	Peg E
	4.79		Peg F
	4.47		Peg G
	3.25		Peg H
		1.84	Datum of R.L 30.00

(15 marks)

b) Briefly explain how to overcome the following obstacles in leveling:

- (i) A building
- (ii) A high wall
- (iii) A shallow pond
- (iv) Steam

(5 marks)