



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

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 = 11.25×10^{-6} per °C
 - (ii) Young modulus = 200KN/mm²

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)