



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECV 4203 : ENGINEERING SURVEY - I

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: SEPTEMBER 2018

TIME: 2 HOURS

DATE: Sep 2018

Instructions to Candidates

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). With an aid of a sketch, describe the essential parts of dumpy level **(10 Marks).**
- b). Discuss the processes of overcoming obstacles such as a water pond encountered during the process of linear surveying **(10 Marks).**
- c). The group of figures below refer to staff readings taken with level from instrument stations, A, B, C, D and E. The first and the last reading in each group were backsight and foresight respectively. The backsight from station A was taken with the staff held on a bench mark at 200.00 m above Ordinance Datum. A: 2.780, 0.900, 0.430, B: 1.765, 1.450, 0.725, C: 1.020, 1.700, 1.325, D: 2.445, 3.560, 2.789, E: 2.745, 2.005, 2.400. Book the readings by the height of instrument method and determine the reduced levels of each station **(10 Marks).**

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

Question TWO (20 Marks)

- a). Explain the procedures of Pythagorean theorem **(10 Marks).**
- b). Discuss ANY five constant errors that must be corrected on a steel band during the process of linear measurements **(10 Marks).**

Question THREE (20 Marks)

- a). Discuss the process of choosing vertical intervals during the process of contouring **(6 Marks).**
- b). Discuss gross error that occur in levelling survey **(10 Marks).**
- c). In levelling across a river, reciprocal leveling observations gave the following results for staffs held vertically at X and Y from level stations A and B on each bank respectively:
- Staff reading of X from A =1.80 m
- Staff reading of X from B =2.11 m
- Staff reading of Y from A =2.60 m
- Staff reading of X from B =2.90 m **(4 Marks).**



Question FOUR (20 Marks)

- a). A steel band of 30 m which has been standardized in a cantenary at a tension of 90 N and at 25 °C has been used to measure a 40-m bay of a baseline. Given the following data, determine the correct length of the bay
- Pull/Tension = 70 N
 - The difference in height between two supports = 0.56 m
 - Radius of Earth's curvature = 6370 Km
 - Base height = 1500 m
 - Mass of the tape = 0.032Kg/m
 - Cross sectional area of the tape = 5.0 mm²
 - Young Modulus of Elasticity = 2.1*10¹¹ N/mm²
 - Coefficient of linear expansion (α) = 1.2*10⁻⁶ / °C
 - Field temperature = 20 °C
- (10 Marks).
- b). Explain the process of reciprocal levelling (10 Marks).

Question FIVE (20 Marks)

- a). Discuss characteristics of contours (10 Marks).
- b). What is an EDM? Discuss the advantages of its use (5 Marks).
- c). Define the following terms as used in levelling:
- Backsight
 - Foresight
 - Intermediate
 - Change Point
 - Reduced level
- (5 Marks).

