



TECHNICAL UNIVERSITY OF

MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY

Department of BUILDING & Civil engineering

UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY CIVIL ENGINEERING

TCV 4214 : ENGINEERING SURVEY I

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2024

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

Answer Booklet, examination pass and student ID

This paper consists of five questions.

Attempt any THREE questions.

Do not write on the question paper.

Question ONE is compulsory (20 Marks).

1a). Explain the following principles of surveying:

- i) Working from whole to the part.
- ii) Observation in the field.

b). A 30 m bay of a baseline was measured using a 30 m steel band that had been standardized in a catenary at a tension of 75 N and a temperature of 20 °C. The following data was recorded:

- Measured length = 30 m
- Applied tension = 100 N
- The radius of Earth's curvature = 6370 Km
- The differences in height between the two points = 0.52 m
- The altitude of the base = 2000 m above sea level
- Cross sectional area of the tape = 6.6 mm²
- Young Modulus of Elasticity (E) = 2.1×10^{11} N/mm²

- Coefficient of Linear Expansion (α) = $11 \times 10^{-6}/^{\circ}\text{C}$
- Mass of the tape = 0.045 Kg/m
- Field temperature = 15°C

Determine all five the corrections

(12 Marks).

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO

- a). The group of figures below refer to staff readings taken with a level from instrument stations, A, B, C, D and E. The first and the last readings in each group are the backsights and foresights respectively. The backsight from station A was taken with the staff held at a bench mark of 204.110 m above Ordinance Datum. The data is provided below: A: 2.305, 0.945, 0.865, 1.325: B: 2.905, 1.205: C: 2.015, 1.365, 0.985, 1.785
- (10 Marks).**

- b). Make short notes under the following:

- i). Gross errors
- ii). Systematic errors

(10 Marks).

QUESTION THREE

- a). Discuss the principle of reciprocal levelling **(12 Marks).**
- b). With an aid of a sketch and figures, discuss direct contouring **(8 Marks).**

QUESTION FOUR

- a). Discuss ANY five characteristics of contours **(5 Marks).**
- b). Explain factors that are considered when identifying survey stations during reconnaissance survey **(10 Marks).**
- c). Two points X and Y are 700 m apart. A level is set up at X and Y in turn and the following readings were taken.

Level at X. Height of collimation 1.650 m. Reading of staff on Y 1.635 m

Level at Y. Height of collimation 1.632 m. Reading of staff on X 1.625 m.

Determine the reduced level of Y if the reduced level of X given that X is 5.040 m

(5 Marks)

QUESTION FIVE

- a). The following levels (Fig. 4) were taken levels were taken to generate a contour map for the purpose of setting out a building. Derive the required contours
(10 Marks).

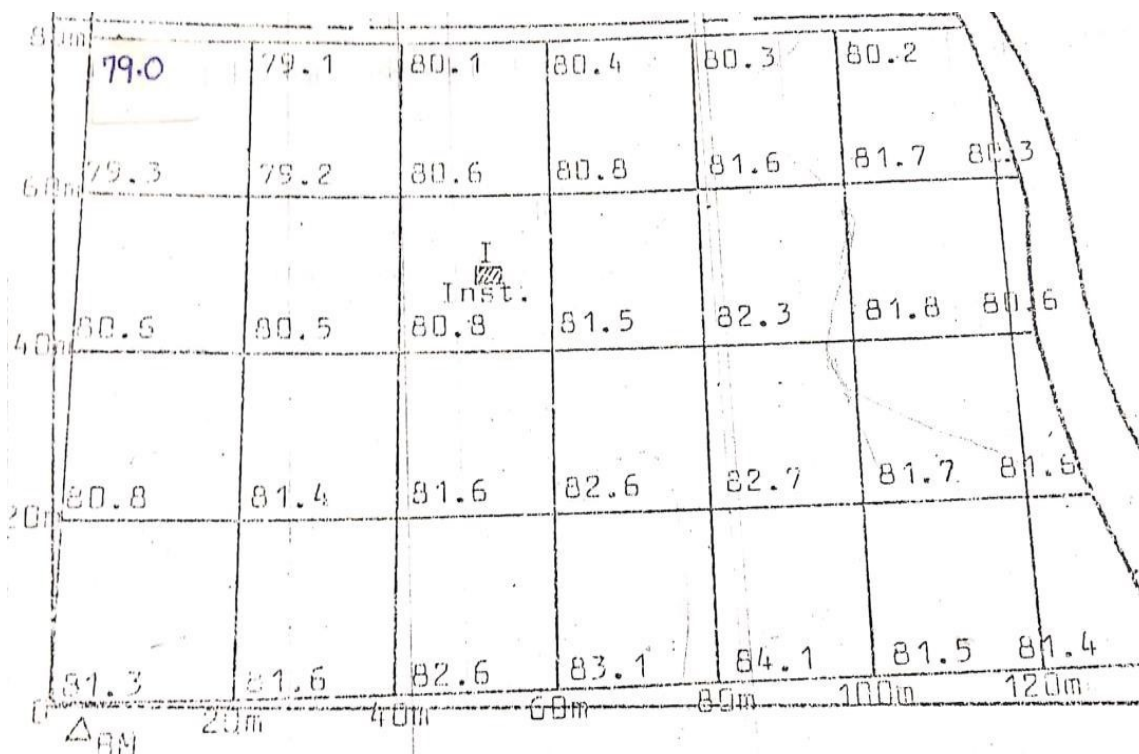


Fig 4: Field for contouring

- b). Discuss the process of two - peg test **(8 Marks).**