



TECHNICAL UNIVERSITY OF MOMBASA
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN BUILDING AND CIVIL ENGINEERING
EBC 1204 : ENGINEERING SURVEYING II

END OF SEMESTER EXAMINATION

SERIES: APRIL 2025

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(20 Marks)

a) Define the following terms as applied in coordinate geometry;

- i) Whole circle bearing
- ii) Quadrantal bearing

(4 Marks)

- b) Convert the following whole circle bearings to quadrantal bearings;
- $130^{\circ} 45'$
 - $273^{\circ} 30'$
- (4 Marks)
- c) Convert the following quadrantal bearings to whole circle bearings;
- $N 39^{\circ} 45' E$
 - $S 45^{\circ} 30' W$
- (4 Marks)
- d) The Tacheometric formulae for determining horizontal distances is,
 $D = K S \cos^2 \theta + C \cos \theta$ when the line of sight is inclined. What are the constants, S and θ ?
- (4 Marks)
- e) Define the following terms as applied in compass traversing;
- Compass station
 - Traverse leg
- (4 Marks)

QUESTION TWO (20 Marks)

- a) Differentiate between polar coordinates and rectangular coordinates (4 marks)
- b) Table 1 below shows rectangular coordinates for points A and B. Determine the polar coordinates for line AB. (8 Marks)

Table 1

Points	Northings (m)	Eastings (m)
A	10,000.00	10,000.00
B	9,500.00	10,500.00

- c) The polar coordinates for the line XY are $150.5 m @ 130^{\circ} 30'$. (Bearing of line X-Y being $130^{\circ} 30'$). The rectangular coordinates for point X are 1530.00mN, 2000.00mE. Determine the rectangular coordinates for Y. (8 Marks)

QUESTION THREE (20 Marks)

- a) Give any five differences between a prismatic compass and a surveyor's compass. (10 Marks)
- b) Sketch and label the parts of a prismatic compass. (10 Marks)

QUESTION FOUR (20 Marks)

- a) Differentiate between a transit and non-transit theodolite. (4 Marks)
- b) Give the functions of the following parts of a theodolite;

- i) Objective lens
- ii) Plummet
- iii) Collimator
- iv) Tangential screws

(4 Marks)

- c) The following readings were taken with a theodolite set at station X and observations made to points 1,2,3 and back to 1. Compute the final reduced angles 1-x-2, 2-x-3, 3-x-1. (12 Marks)

Table 2

Station	Point	Face Left	Face Right
X	1	030 ° 45 ' 10	210 ° 45 ' 12
	2	151 ° 30 ' 32	331 ° 30 ' 30
	3	233 ° 25 ' 25	053 ° 25 ' 20
	1	030 ° 45 ' 17	210 ° 45 ' 14

QUESTION FIVE (20 Marks)

- a) A Tacheometer with telescope horizontal and staff held vertical was set at a point X and observations made to a levelling staff at point Y. the upper, mid and lower readings on staff were 2.04 2.2 and 2.0 respectively. The multiplying and addition constants were 100 and zero respectively. Determine the horizontal distance XY. (8 Marks)
- b) Differentiate between temporary and permanent adjustment of a theodolite. (4 Marks)
- c) Outline the activities involved when performing the following temporary adjustments;
- i) Centering the theodolite over the ground station
 - ii) Levelling of theodolite bubbles
 - iii) Focusing and removal of parallax from lenses

(8 Marks)