

073105T4LAS

LAND SURVEY AND MAPPING LEVEL 5

LSM/OS/LM/CR/01/5/A

Conduct Topographical Survey

Nov/Dec 2024



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

**WRIT ENT
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INSTRUCTIONS TO CANDIDATE

1. Marks for each question are indicated in the brackets.
2. The paper consists of **TWO** sections: **A** and **B**.
3. Candidates are provided with a separate answer booklet
4. **DO NOT** write on this question paper.

This paper consists of FOUR (4) printed pages

**Candidates should check the question paper to ascertain that all
pages are printed as indicated and that no questions are missing.**

SECTION A: (40 MARKS)***Answer ALL the questions in this section.***

1. Control points are the cornerstone in the Surveying profession and in any Surveying activity. Define the term control point. (2 marks)
2. In the surveying process, Reconnaissance is the first activity to be done during fieldwork activities as a pre-visit is made on arrival to the site. Define Reconnaissance and state THREE of its objectives. (5 marks)
3. Monuments are used in survey to delineate the position of control points on the ground surface. Highlight FIVE different types of monuments used in surveying (5 marks)
4. Horizontal and vertical controls are developed to create a framework around which other surveys can be adjusted. These control surveys are used for accurate mapping projects in the construction of roads and tunnels. Outline the main difference between horizontal and vertical control. (4 marks)
5. There are more than 200 projections in use and can be categorized in different groups. Briefly explain the term map project OUR different types of map projections. (5 marks)
6. It is of great importance to pick data of heights on the earth's surface indicating positional data (coordinate n (H). Briefly elucidate the procedure of picking detail points and spot heights on the ground using a Total Station given the coordinates of two ground control points A and B. (5 marks)
7. A contour assists a surveyor to determine the terrain of an area. Define the term contour. (2 marks)
8. Map elements assist a surveyor to interpret a map correctly and to obtain more information about the area the map belongs to. List down THREE cartographic map elements (3 marks)
9. Angle and direction measurements are picked on the ground by surveyors to assist in the computation of coordinates of points on the earth's surface. State TWO survey instruments used to measure angles in the field. (2 marks)
10. Coordinate transformations facilitate the transformation from one coordinate system to another depending on the map projection of the area of interest. Highlight THREE coordinate systems used in the world today. (3 marks)
11. The knowledge on the characteristics of contour lines aid the plotting and interpretation of the features on a map. Highlight FOUR characteristics of contours. (4 marks)

SECTION B: (60 MARKS)**Answer Any THREE Questions in This Section**

12.

- a) Linear measurement plays an integral part of Land Survey. There are several methods of linear measurement. State and explain any FIVE methods of linear measurement.

(10 marks)

- b) The outcome of a topographic survey being a topographic map, it should be judged by the map, and the map should be judged by the manner in which it serves the general purpose.

i. Briefly outline the term topographical surveying (2 marks)

ii. Discuss any FOUR applications of topographical survey. (8 marks)

13. In a control survey the relative positions of a framework of reference points are determined to act as a base for detail survey or setting out works. The control framework is used as a basis for further survey is “working from whole to part”.

Discuss the various methods of prov

a) Horizontal control; (12 marks)

b) Vertical control. (8 marks)

14. Calculate the total coordinates of all stations in the following traverse given that station A (0, 0) is the origin. Adjust the coordinates using Bowditch’s rule and determine the accuracy of the traverse. (20 marks)

LINE	AB	BC	CD	DE	EA
Whole Circle Bearing	29° 30’	100° 45’	146° 30’	242° 00’	278° 45’
Length(m)	83.50	59.40	62.00	50.30	90.40

15.

- a) The aim of leveling is to determine the relative heights of different objects on or below the surface of the earth to determine the undulation of the ground surface.

Briefly explain the following terms as used in levelling:

i. Levelling; (2 marks)

- ii. Level line; (2 marks)
- iii. Datum surface; (2 marks)
- iv. Back sight. (2 marks)

- b) The following is the page of a level book, where some readings were missing. Fill in the missing readings and calculate the reduced levels of all the points. Also perform all the arithmetic checks. (12 marks)

Station	BS	IS	FS	Rise(+)	Fall(-)	RL	Remark
1	3.250					249.260	BM
2	1.755		?		0.750		CP
3		1.950					
4	?		1.920				CP
5		2.340		1.500			
6		?					
7	1.850		2.1				CP
8		1.575					
9		?					
10	?		1.895	1.650			CP
11			1.350	0.750			