



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY
DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

CIVIL ENGINEERING

MODULE: Surveying for Civil Engineering Works PAPER NO: 578/23/M05

DURATION: 3 Hours

MAY / JUNE 2024 EXAMINATION

REQUIREMENTS

Scientific calculator

INSTRUCTIONS TO CANDIDATE

- 1. Answer all questions.**
- 2. Do not write anything on question paper.**
- 3. Do not tear any paper.**

This paper consists of 3 printed pages.

QUESTION 1

- a) There are several ways of getting volumes in all construction works especially earthwork. Briefly describe the following as used in finding volumes of earthworks.

- i) Volume from cross section
- ii) Volume from spot height
- iii) Volume from contours

Use diagrams in your solution.

(15 marks)

- b) Briefly explain the Mass Haul diagram using a diagram. (10 marks)

QUESTION 2

- a) A church was observed from a point A, 3km from the church. Observations were taken to D the top of the roof of the church and C the top of the tower vertically above D.

Given:

Vertical angle to the of the roof = 10°

Vertical angle to the top of the tower = 15°

AB, the horizontal distance to the church = 3km

Calculate:

- i) The total height of the church (8 marks)
- ii) The height of the tower DC. (8 marks)

- b) Define the term hydrographic surveys and list any five (5) pieces of equipment used for sounding in measurement. (9 marks)

QUESTION 3

- a) Briefly describe what a curve ranging is, giving an example. (5 marks)
- b) Write short notes on the following three (3) main headings of curves:
- i) Circular curves (5 marks)
 - ii) Transition curves (5 marks)
 - iii) Vertical curves (5 marks)
- c) Outline the advantages of using a fathometer in sounding. (5 marks)

QUESTION 4

- a) State the importance of calculating Earthworks. (5 marks)
- b) State the use of a planimeter and explain how it is used. (5 marks)
- c) Describe the two (2) main classifications of EDM instruments. (10 marks)
- d) Explain the measuring principle of an EDM. (5 marks)

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