



ZIMBABWE

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

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL CERTIFICATE

IN

CIVIL ENGINEERING

MODULE: Engineering Survey

PAPER NO: 313/22/M04

DURATION: 3 hours

MAY/JUNE 2024 EXAMINATION

REQUIREMENTS

Scientific calculator

INSTRUCTIONS TO CANDIDATE

- 1) Answer all questions.**
- 2) Each question carry equal marks.**

This paper consists of 3 printed pages.

QUESTION 1

- a) Briefly describe the intention of working from the whole to the part and hence outline the procedure of going around it. (12 marks)
- b) Differentiate using diagrams/ any illustration, the difference between accuracy and precision. (8 marks)
- c) Illustrate how parallax is removed before making observations. (5 marks)

QUESTION 2

- a) State the three (3) methods of showing scale on a map. (3 marks)
- b) Calculate the area enclosed by the plot demarcated by ABCD given the coordinates as follows:

y	m	x
A + 420		+1296
A + 898		+1452
A + 1026		+164
D + 688		+646

(10 marks)

- c) Briefly describe six (6) corrections applied to distance measured using a tape. (12 marks)

QUESTION 3

- a) During a levelling exercise on a slopping ground, the following readings were taken by an automatic level and a 4m staff:-
0.485; +1.020; +1.785; +3.395; (3.875; 0.360); +1.305; +1.785; +2.675; 3.385;
3.855; +1.855; 1.705

Draw up a page of the level book and determine the reduced level of various points by rise and fall method. If the reduced level of the point on which the first reading was taken is 264.350m. (20 marks)

- b) Outline five (5) pieces of equipment used in levelling. (5 marks)

QUESTION 4

A survey measured the distance AB under the following conditions:

Line	Distance	Zenth angle	Field tension	Field T°C	No of Bays
AB	99,789	91° 50'	95N	30°C	3

Tape details were given as follows

Standard tension 70N

Standard temperature 23°C

Mass/metre 0,012kg/m

Gross sectional area 0,05cm²

Coefficient of expansion $1.17 \times 10^{-5}/^{\circ}\text{C}$

Mean height of line AB 1650m

Mean radius of the earth 6361,1km

1kg of force=9.81N

Calculate the mean sea level distance

(25 marks)

E = young modulus $260 \times 10^9 \text{ N/m}^2$

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