



ZIMBABWE

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

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

WATER RESOURCES ENGINEERING

**MODULE: Water Treatment Plant
Designing and Processes**

PAPER NO: 588/23/M04

DURATION: 3 Hours

MAY/JUNE 2024 EXAMINATION

REQUIREMENTS

INSTRUCTIONS TO CANDIDATE

1. Answer any five (5) questions.
2. All questions carry equal marks.
3. Start each question on a new page.
4. Do not tear off any pages.
5. Do not write anything on question paper.

This paper consists of 3 printed pages.

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QUESTION 1

- a) Define water demand. (3 marks)
- b) Discuss the various factors influencing water demand. (12 marks)
- c) Highlight the importance of forecasting and managing water demand. (5 marks)

QUESTION 2

Explain the stages involved in conventional water treatment process. (20 marks)

QUESTION 3

- a) Define “Site Plan”. (2 marks)
- b) List and explain factors to be considered when producing a layout of different units on a treatment plan. (15 marks)
- c) Highlight the importance of a site plan. (3 marks)

QUESTION 4

Describe and explain the following terms in relation to the setting out procedure.

- a)
 - i) Temporary bench mark (TBM). (3 marks)
 - ii) Baseline (3 marks)
 - iii) Horizontal controls (3 marks)
 - iv) Vertical Controls (3 marks)
- b) Outline geotechnical characteristics when excavating a foundation. (8 marks)

QUESTION 5

- a) Explain the term “superstructure” as used in water engineering. (4 marks)

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- b) Describe the following superstructures in water engineering:
- i) Dams and reservoirs. (4 marks)
 - ii) Bridges and culverts. (4 marks)
 - iii) Pumping stations and treatment plants. (4 marks)
 - iv) Water towers and tanks. (4 marks)

QUESTION 6

- a) Describe the water sampling process (15 marks)
- b) Highlight the need for water sampling. (5 marks)

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