



ZIMBABWE

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

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

ABT, WATER AND SANITATION MANAGEMENT, EHT

MODULE: Research Methods and Statistics PAPER NO: 503/23/M09

DURATION: 3 Hours

JUNE 2026 EXAMINATION

REQUIREMENTS

- 1) Scientific calculator
- 2) Chi-square table

INSTRUCTIONS TO CANDIDATE

- 1) There are six (6) questions.
- 2) Choose any five (5) for the examination.
- 3) Each question carries 20 marks.
- 4) The exam is 3 hours.

This paper consists of 3 printed pages.

QUESTION 1

- a) List the five (5) key characteristics of good research objectives. (5 marks)
- b) State and explain any three (3) purposes of conducting a research. (6 marks)
- c) Discuss key aspects that characterise a research process. (9 marks)

QUESTION 2

- a) Explain the following probability sampling designs:
 - i) Simple random sampling (4 marks)
 - ii) Systematic sampling (4 marks)
 - iii) Stratified sampling (4 marks)
- b) Discuss any four (4) reasons why researchers work with samples rather than the entire population. (8 marks)

QUESTION 3

- a) Distinguish between a parameter and a statistic. (4 marks)
- b) Distinguish between descriptive and inferential statistics. (4 marks)
- c) Distinguish between a null hypothesis and an alternative hypothesis. (4 marks)
- d) State the disadvantage of using observation schedules during data collection. (8 marks)

QUESTION 4

Outline every stage involved in compiling a research proposal. (20 marks)

QUESTION 5

A new coagulant has been donated by a well wisher and your supervisor has tasked you to assess whether the coagulant is effective or not. Identify and describe the research design you will choose for this task. (20 marks)

QUESTION 6

Given the table below

		Treatment (floculator)		
		Mechanical	Hydraulic	Total
Was the flocculation good	Yes	28	48	76
	No	10	114	124
Total		38	162	200

The table is showing two categorical variables here

- Treatment – with either use of mechanical or hydraulic flocculator
- Flocculation outcome-either well flocculated or poorly flocculated
- 200 treatment units were observed

Using the chisquare test to investigate whether there is a relationship between The two categorical variables i.e does the outcome of flocculation process relate to type of floccutor used.

Use the value 0.05 for P

(20 marks)

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