



ZIMBABWE

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

NATIONAL CERTIFICATE

IN

BIOMEDICAL ENGINEERING

**MODULE: Biomedical Equipment Installation
(Instrumentation)**

PAPER NO: 450/22/M06

DURATION: 3 Hours

NOVEMBER/ DECEMBER 2025 EXAMINATION

REQUIREMENTS

Non-programmable Scientific calculator

INSTRUCTIONS TO CANDIDATES

1. Question paper has two (2) sections.
2. SECTION A contains four (4) questions, each question in SECTION A carries 10 marks.
3. Answer all questions in SECTION A.
4. SECTION B contains four (4) questions, each question carries 20 marks.
5. Answer three (3) questions in SECTION B.
6. Do not write your name on the Answer Booklet AND/OR question paper.

This paper consists of 3 printed page.

PAPER NO: 450/22/M06 – BIOMEDICAL EQUIPMENT INSTALLATION
(INSTRUMENTATION)

SECTION A

Answer all questions.

QUESTION 1

Copy and complete the table below:

UNIT NAME	UNIT SYMBOL	PHYSICAL QUANTITY
		(1)
Mole	(1)	Temperature
(1)	(1)	(1)
Kilogram	(1)	Time
(1)	(1)	(1)
(1)	A	

QUESTION 2

- a) Define the term biosignal. (4 marks)
- b) State two uses of biosignals (2 marks)
- c) Describe the following terms:
- i) Chemical biosignal (2 marks)
- ii) Mechanical biosignal (2 marks)

QUESTION 3

Describe the function of biomedical instruments in the following specialised medical facilities/departments:

- a) Dental (2 marks)
- b) Maternity (2 marks)
- c) General wards (2 marks)
- d) Theatre (2 marks)
- e) Radiology (2 marks)

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QUESTION 4

- a) Define the term transducer. (2 marks)
- b) State and explain the two (2) types of transducers. (4 marks)
- c) State four (4) transducers of your choice. (4 marks)

SECTION B

Choose three (3) questions out of four (4).

QUESTION 5

- a) Sketch a general diagram for a measurement structure. (5 marks)
- b) Explain the following performance characteristics:
 - i) Speed of response (2 marks)
 - ii) Dynamic error (2 marks)
 - iii) Fidelity (2 marks)
 - iv) Lag (2 marks)
- c) Distinguish between accuracy and precision. (4 marks)
- d) Define the term error propagation. (2 marks)
- e) What is a derived unit. (1 mark)