



GWANDA STATE UNIVERSITY
FACULTY OF ENGINEERING AND ENVIRONMENT
DEPARTMENT OF METALLURGICAL ENGINEERING
RESEARCH METHODS FOR METALLURGICAL ENGINEERS
EMG 3206
Part III Second Semester Examination Paper
April 2025

This examination paper consists of two printed pages.

Time Allowed: 3 Hours

Total Marks: 100

Dr Nkomo Fortune

INSTRUCTIONS

1. Answer **ALL** questions in **Section A** and any **TWO** from **Section B**
2. Each question carries 25 marks.
3. Use of calculators is permissible.

Additional Requirements

Normal Distribution Table

MARK ALLOCATION

Section A	50 Marks
Section B	50 Marks
Part Questions	As shown in each part question
Total Attainable	100

SECTION A (50 MARKS)
ANSWER ALL QUESTIONS

Question A1

- i. Define research methods and methodology. [5]
- ii. What is the major difference between methods and methodology? [5]
- iii. Discuss the factors to consider when selecting a research topic [5]
- iv. What constitutes successful research proposal? [10]

Question A2

- i. State components of an introduction section of a research report. [5]
- ii. What do you understand by the term sampling in research. [5]
- iii. Discuss sampling techniques. [5]
- iv. Explain advantages and disadvantages of sampling during data collection. [10]

SECTION B (50 MARKS)
ANSWER ANY TWO QUESTIONS

Question B1

Identify a research topic and briefly illustrate the following: statement of the problem, the aim of the study, two objectives of the study; Null and alternative hypothesis of the research, and proposed methodology [25]

Question B2

- i. What is your approach to formulating hypotheses in your metallurgical research projects? [5]
- ii. Explain the significance of selecting the right statistical tests for hypothesis testing in metallurgical experiments? [6]
- iii. What steps do you take to ensure your sample size is adequate for robust hypothesis testing? [7]
- iv. How do you assess the validity and reliability of your experimental results in relation to your hypothesis [7]

Question B3

- i. How do you determine the relevance and credibility of sources during your literature review? [8]
- ii. Discuss the probability sampling with merits and demerits. [8]
- iii. Define the conceptual framework and how significant is it to the design of research proposal? [9]

END OF QUESTION PAPER