



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

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. Explain in detail the research process **[5]**
- ii. Highlight five factors to consider when selecting a research topic **[10]**
- iii. You have collected data on the tensile strength of a new metal composite. Explain how you would use statistical methods to determine if the results are statistically significant. **[10]**

Question A2

- i. Differentiate between in-text citation and a list of references **[5]**
- ii. Explain the concept of probability sampling and outline its benefits and drawbacks. **[10]**
- iii. Identify elements of a successful research proposal in detail **[10]**

SECTION B (50 MARKS)
ANSWER ANY TWO QUESTIONS

Question B1

- i. How do you incorporate visuals (graphs, tables, images) in technical writing to enhance comprehension? **[12]**
- ii. What are the essential components of a well-structured technical paper in metallurgical engineering? **[13]**

Question B2

Discuss the ethical considerations that must be taken into account during metallurgical research. How do these considerations affect research design and implementation? **[25]**

Question B3

Given a hypothetical scenario where a new alloy is developed, outline a research approach to assess its mechanical properties. What tests would you conduct, and how would you analyze the data? **[25]**

END OF QUESTION PAPER