GWANDA STATE UNIVERSITY

FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF HORTICULTURE AND CROP PRODUCTION

BACHELOR OF SCIENCE HONOURS DEGREE IN HORTICULTURE & CROP PRODUCTION/ANIMAL PRODUCTION AND HEALTH

NHC1106/NAP1102 INTRODUCTION TO MICROBIOLOGY

Main Examination Paper December 2025

This examination paper consists of Three pages.

Time Allowed: **Three (3) Hours**

Total Marks: **100**

Special Requirements: **None**

Examiner's Name: **Ms N Mbiza**

INSTRUCTIONS

1. Answer **ALL** questions in Section A
2. Answer **THREE (3)** questions in Section B

MARK ALLOCATION

QUESTION	MARKS
SECTION A	40
SECTION B	60
TOTAL ATTAINABLE MARKS	100

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Section A: ANSWER ALL QUESTIONS

Question 1: Distinguish between the following:

a. Arbuscular mycorrhizae and rhizobacteria. [2]
b. Transmission electron microscope and scanning electron microscope. [2]
c. Transmission electron microscope and scanning electron microscope. [2]
d. Micrometre and nanometre [2]
e. Budding and binary fission [2]
f. Selective and enrichment media [2]

Question 2

Match the following types of antimicrobials with their actions:

— Bacteriostatic	a) Kills microbes
— Germicidal	(b) Inactivates viruses
— Viricidal	(c) Kills bacteria
— Sporicidal	(d) Stops bacterial growth
— Fungicidal	(e) Kills bacterial endospores and fungal spores
— Bacteriocidal	(f) Kills yeasts and molds

[6]

Question 3

a. Complete the following table:

Differences between Gram-positive and Gram-negative bacteria [10]

Bacterial characters	**Gram Positive**	**Gram Negative**
Cell Wall		
Outer membrane		
Toxin Produced		
Resistance to Antibiotics		

Example		

b. Explain Koch's postulates [4]

c. Describe the process of sporulation in bacterial organisms with the aid of a diagram [10]

Section B. Answer THREE questions

Question 4

a) Explain **2** distinguishing characteristics of prokaryotic cells [4]
b) Draw and explain the bacterial growth curve [16]

Question 5

a. List **FIVE** factors that can affect the quality of silage and explain how they influence the fermentation process. [5]

b. Discuss the **FIVE** steps used to characterize microorganisms in the laboratory [15]

Question 6

a. Explain **FIVE** roles of microbes in agriculture [10]

b. Describe Louis Pasteur's contribution to Microbiology [10]

Question 7

a. What are growth factors and how are they important for microbial nutrition [10]

b. Using appropriate examples, explain spore formation in bacterial cells [10]

END OF EXAMINATION PAPER