



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES**

**DEPARTMENT OF NATURAL AND APPLIED SCIENCES**

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| <b>QUALIFICATION: BACHELOR OF SCIENCE (HONOURS)</b> |   |
| <b>QUALIFICATION CODE: 08BOSC</b>                   | <b>LEVEL: 8</b>   |
| <b>COURSE CODE: MSP811S</b>                         | <b>COURSE NAME: MICROBIAL SYSTEMATICS AND PROCESSES</b> |
| <b>SESSION: JUNE 2022</b>                           | <b>PAPER: THEORY</b>                                    |
| <b>DURATION: 3 HOURS</b>                            | <b>MARKS: 120</b>                                       |

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| <b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b> |                                      |
| <b>EXAMINER(S)</b>                                  | <b>Prof Percy Chimwamurombe</b>      |
| <b>MODERATOR:</b>                                   | <b>Dr Jean-Damascene Uzabakiriho</b> |

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| <b>INSTRUCTIONS</b>  |
| <ol style="list-style-type: none"><li>1. Answer ALL the questions.</li><li>2. Write clearly and neatly.</li><li>3. Number the answers clearly.</li></ol> |

***PERMISSIBLE MATERIALS***

Non-programmable Calculators

**ATTACHMENTS**

None

**THIS QUESTION PAPER CONSISTS OF 2 PAGES (Including this front page)**

**Section A:****[60 marks]**

1. When a new organism is described, certain procedures take place before its name and description become "official." Explain this process. (5 marks)
2. Explain the defining features of Enteric bacteria. (5 marks)
3. Explain how *Wolbachia* and *Bacillus thuringiensis* might be used as natural insecticides against arthropods and insects, respectively. (5 marks)
4. *Archaeoglobus* represent a metabolically transitional type of organism that bridged the energy generating processes of Sulfur (S) production and methanogenesis. Briefly explain? (5 marks)
5. Compare and contrast *Pyrodictium* and *Pyrolobus*. (5 marks)
6. Locate where the thermosome is found and explain its apparent role. (5 marks)
7. Speculate on the possibility of life on other planets. (5 marks)
8. Briefly discuss why Carl Woese is an important figure in microbial classification and taxonomy? (5 marks)
9. Determine the GC content of the molecule below? (5 marks)  
  
-CAAAAAGAAAAAGCCAACCAAGGGCAAAAACGGCCACGA-
10. Multiple phylogenetic probes can be used on a single sample. Explain. (5 marks)
11. Explain why the presence of many *Archaea* has only been confirmed by community sampling of rRNA genes and not by culture in the laboratory. (5 marks)
12. Explain why *Nanoarchaeum* is classified as a cell rather than a non-cell. (5 marks)

**Section B (Essays):****[60 marks]**

1. Describe the diversity in the Proteobacteria. (30 marks)
2. "We only know about 5-10% of the bacteria out there". Comment on this statement in an essay highlighting the technological challenges in generating data to name new bacteria microbes. (30 marks)