



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

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

**DEPARTMENT OF NATURAL AND APPLIED SCIENCES**

<b>QUALIFICATION : BACHELOR OF SCIENCE (Hon)</b>	
<b>QUALIFICATION CODE:</b>	<b>LEVEL: 8</b>
<b>COURSE CODE: AMB821S</b>	<b>COURSE NAME: ADVANCED MICROBIOLOGY</b>
<b>SESSION: NOVEMBER 2022</b>	<b>PAPER: THEORY</b>
<b>TIME: 3 HOURS</b>	<b>MARKS: 100</b>

<b>FIRST OPPORTUNITY EXAMINATIONS QUESTION PAPER</b>	
<b>EXAMINER(S)</b>	<b>DR MUNYARADZI ZIVUKU</b>
<b>MODERATOR:</b>	<b>PROF JANE MISIHAIRABGWI</b>

**Instructions**

1. Answer **all** questions
2. Answer the questions in the booklet provided
3. Write clearly and neatly
4. All written work **MUST** be done in blue or black ink
5. Mark all answers clearly with their respective question numbers

**THIS QUESTION PAPER CONSISTS OF 3 PAGES  
(INCLUDING THIS FRONT PAGE)**

## SECTION A (40 MARKS)

### QUESTION 1 (20)

- 1.1 Differentiate between continuous culture and batch culture. (2)
- 1.2 Describe the significance of antibiotic susceptibility testing. (3)
- 1.3 Following the breakdown of glucose to give pyruvate, pyruvate is further metabolised to give various products. Briefly outline the fate of pyruvate in respiration. (6)
- 1.4 Microorganisms are able to carry out fermentation depending on their metabolic pathways. Briefly evaluate three different types of fermentation common in microorganisms. (9)

### QUESTION 2 (20)

- 2.1 Jane is fourth year B.Sc. Honours student and she did an experiment to analyse the microbial load of water samples using the Most Probable Number (MPN) method in her laboratory. Jane used the MPN table (illustrated in table 1) and got an MPN of 9.2 per 100 ml.

Table1: Table of the most Probable Number (MPN) per 100ml of sampling using three tubes of each dilution

	Number of positive tubes in dilutions			
	10 ml	1 ml	0.1 ml	MPN per 100 ml
A	0	0	0	
B	0	1	0	3
C	0	0	3	6
D	0	1	0	3
E	0	1	1	6.1
X	0	1	2	9.2
G	0	1	3	12

- 2.1.1 Briefly describe the principle and procedure of MPN that she used to arrive at an MPN of the row labelled X in the table. (7)

- 2.2 Briefly describe how microorganisms can be used in the recovery of low grade ores. (7)
- 2.3 Briefly discuss the use of coliforms as diagnostic tools in food and water. (7)

## **SECTION B (60 MARKS)**

### **QUESTION 3 (20)**

- 3.1 Discuss how infectious diseases such Ebola virus can be prevented and controlled. (5)
- 3.2 Discuss how protoplast fusion has been used to manipulate microorganisms genetically for industrial use. (5)
- 3.3 Outline the role of the human microbiome. (10)

### **QUESTION 4 (20)**

- 4.1 Testing for coliforms is sometimes accompanied by biochemical tests such as IMViC. What does is the principle underlying the IMViC test in microorganisms? (8)
- 4.2 Discuss the role of microorganisms in the production of hard cheese such as Gouda. (12)

### **QUESTION 5 (20)**

- 5.1 What are the disadvantages of MPN method as a diagnostic tool in microbiological samples. (3)
- 5.2 Tabulate the differences between cell mediated and human mediated immunity. (7)
- 5.3 Briefly describe the changes in antibody concentrations following the initial dose of Covid-19 jab and how that leads to conferment of long lasting immunity to an individual. (10)

END OF QUESTION PAPER