

**UNIVERSITY OF ESWATINI**  
**FINAL EXAMINATION PAPER: NOVEMBER 2021**

**TITLE OF PAPER: MICROBIOLOGY AND IMMUNOLOGY**

**COURSE CODE: BIO432**

**TIME ALLOWED: THREE HOURS**

**INSTRUCTIONS:**

1. ANSWER ANY **FOUR** QUESTIONS
2. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS
3. ILLUSTRATE YOUR ANSWERS WITH LARGE AND CLEARLY LABELLED DIAGRAMS WHERE APPROPRIATE

**SPECIAL REQUIREMENTS: NONE**

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATORS.

**[PLEASE TURN OVER]**

**Question 1**

- a) Name the disease caused by each of the following microorganisms: *Mycobacterium*, *Corynebacterium*, *Klebsiella*, *Clostridium*, *Salmonella*, and *Vibrio* spp. (3 marks)
- b) Distinguish between the roles played by non-specific and specific defence systems in humans. (5 marks)
- c) List some examples of microorganisms that are commonly used in water testing for quality determination. (5 marks)
- d) Differentiate between an antigen and an antibody. (1 mark)
- e) Indicate the minimum number of methods that are employed in viral detection within tissues. (2 marks)
- f) Define: LD50 and ID50. (3 marks)
- g) List some methods that are employed in typing bacteria (2 marks)
- h) Define an infectious unit of a virus. (2 marks)
- i) Give some examples of the antibiotics penicillins and tetracyclines (3 marks)

[Total Marks = 25]

**Question 2**

- a) Explain the determinants of microbial pathogenicity. (12.5 marks)
- b) Explain the mechanisms of action of antibiotics. (12.5 marks)

[Total Marks = 25]

[PLEASE TURN OVER]

**Question 3**

- a) Name the different groups of the genus *Streptococcus*. (5 marks)
- b) Explain the pathogenicities of:
- i. *Streptococcus pyogenes* (10 marks)
  - ii. *Staphylococcus* species (10 marks)

**[Total Marks= 25]****Question 4**

- a) Outline the major phases of an animal immune systems based on the self\_ versus non-self\_ recognition. (4 marks)
- b) Summarize the role of the complement system and interferons in non-specific resistance to human infections. (9 marks)
- c) Explain the cellular and physiological mechanisms behind anaphylactic hypersensitivity Type 1. (5 marks)
- d) Provide a flow chart of the T – cell subsets and their functions and then briefly explain how T<sub>c</sub> and T<sub>h</sub> react against viruses within host cells. (7 marks)

**[Total Marks= 25]**

**Question 5**

Write an essay on the following:

- a) Malignant transformation by tumor inducing viruses. (12.5marks)
- b) Viral pathogenesis. (12.5marks)

**[Total Marks= 25]**

**Question 6**

- a) Demonstrate how multi-potent homopoietic stem cells in the bone marrow differentiate into cells of the immune system. (10 marks)
- b) Explain the role of B cells in specific host resistance to human pathogens. (10 marks)
- c) Relate the concept of vaccines with that of immunologic memory. (5 marks)

**[Total Marks= 25]**

**[END OF EXAMINATION PAPER]**