



UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

Department of Environmental Health Sciences

Final Examination 2009

TITLE OF PAPER : INTRODUCTION TO MICROBIOLOGY
AND IMMUNOLOGY

COURSE CODE : HSC 105

DURATION : 3 HOURS

MARKS : 100

INSTRUCTIONS : READ THE QUESTIONS & INSTRUCTIONS
CAREFULLY.

ANSWER ANY FOUR QUESTIONS.

EACH QUESTION CARRIES 25 MARKS.

NO PAPER SHOULD BE BROUGHT INTO NOR OUT
OF THE EXAMINATION ROOM.

BEGIN EACH QUESTION ON A SEPARATE SHEET
OF PAPER.

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED
BY THE INVIGILATOR.**

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QUESTION 1

- a) Indicate the practical applications of capsule and negative staining. (3 marks)
- b) Why is Gram stain a differential staining technique? (2 marks)
- c) Separate the following into gram-positive and gram-negative organisms:
Neisseria, Bacillus, Escherichia, Salmonella, Shigella, Vibrio, Clostridium, Klebsiella, Corynebacterium, Staphylococcus, Haemophilus, and Mycobacterium species. (9 marks)
- d) Name one disease caused by each of the bacteria listed in (c) above. (6 marks)
- e) Distinguish between self infection and cross infection. (1 mark)
- f) Define the terms: 50% infectious dose and 50% lethal dose. (2 marks)
- g) Give a list of a generalized sequence of the stages of infection. (2 marks)

[TOTAL MARKS = 25]

QUESTION 2

- a) Draw a well labelled diagram of a bacterium. (5 marks)
- b) Distinguish between *Bacillus* and bacillus. (2 marks)
- c) What are the shapes of bacteria? Elaborate. (3 marks)
- d) Draw the following:
 - (i) logarithmic curve (2 marks)
 - (ii) exponential curve (2 marks)
 - (iii) logistic curve (2 marks)
- e) Explain the phases of d(iii) above. (4 marks)
- f) Explain the pathogenicity of any bacterial pathogen of your choice. (5 marks)

[TOTAL MARKS = 25]

QUESTION 3

- a) Indicate the importance of bone marrow stem cell in generating the cells of the immune system. (5 marks)
- b) Show that specific immune response results from the cooperation of various immune cells. (5 marks)
- c) Write short notes on the following:
 - i) T cell subsets and their functions (4 marks)
 - ii) structure of an antibody (4 marks)
 - iii) immunologic memory (3 marks)
 - iv) immune defects (4 marks)

[TOTAL MARKS = 25]

QUESTION 4

- a) What is a virus? (5 marks)
- b) Explain the following:
 - (i) biology of influenza virus (5 marks)
 - (ii) viral reproduction within cells (5 marks)
 - (iii) retroviruses (4 marks)
- c) What is the relevance of viruses to humans? (6 marks)

[TOTAL MARKS = 25]

QUESTION 5

- a) Define the term “antigen” (2marks)
- b) Provide the salient features of a partial antigen, complete antigen and an incomplete antigen. (7 marks)
- c) Explain the events that occur during anaphylaxis. (4 marks)
- d) Indicate whether the following grafts would be accepted or rejected by a patient: (6 marks)
- isograft
 - autograft
 - allograft
 - allograft + cytotoxic drugs
 - heterograft
 - heterograft + cytotoxic drugs
- e) Explain the role of B cells in the immune response. (6 marks)

[TOTAL MARKS = 25]

QUESTION 6

- a) Convince a non mycologist that fungi are important in human life. (6 marks)
- b) Explain the types of mycoses you know. (10 marks)
- c) Indicate the major mechanisms of fungal pathogenesis. (4 marks)
- d) What is aflatoxicoses? (1 mark)
- e) Elaborate on the toxic effects of aflatoxins. (4 marks)

[TOTAL MARKS = 25]