

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER: 2010/2011

TITLE OF PAPER: MICROBIOLOGY AND IMMUNOLOGY

COURSE CODE: B404

TIME ALLOWED: THREE HOURS

INSTRUCTIONS:

1. ANSWER QUESTION ONE AND ANY THREE 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

QUESTION 1 (COMPULSORY)

- (a) Indicate the practical application of negative staining. (1 mark)
- (b) Why is the Gram stain a differential staining technique? (1 mark)
- (c) Separate the following bacteria into gram-positive and gram-negative organisms:
Neisseria, Bacillus, Escherichia, Salmonella, Shigella, Vibrio, Clostridium, Klebsiella, Corynebacterium, Staphylococcus, Haemophilus and *Mycobacterium* species. (6 marks)
- (d) Name one disease caused by each of the bacteria listed in (c) above. (6 marks)
- (e) What is the role of dipicolinic acid in bacterial sporogenesis? (1 mark)
- (f) Name the different methods that are employed in typing bacteria. (2 marks)
- (g) Distinguish between self-infection and cross-infection. (1 mark)
- (h) Define the terms: 50% infectious dose and 50% lethal dose. (1 mark)
- (i) Name two mechanisms through which bacteria cause disease. (1 mark)
- (j) Give a list of a generalized sequence of the stages of infection. (2 marks)
- (k) Indicate whether the following grafts would be accepted or rejected by a patient:
- isograft
 - autograft
 - allograft
 - allograft + cytotoxic drugs
 - heterograft + cytotoxic drugs
 - heterograft
- (3 marks)

[TOTAL MARKS = 25]

QUESTION 2

Write an essay on *Staphylococcus aureus* in terms of its important properties, pathogenesis, and disease prevention.

[TOTAL MARKS = 25]

QUESTION 3

- a) Give a flow chart to demonstrate that the cells of the immune system originate from the bone marrow stem cell. (5 marks)
- b) Indicate the role of B and T cells in specific host resistance. (15 marks)
- c) Explain the concept of immune defects. (5 marks)

[TOTAL MARKS = 25]

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QUESTION 4

- a) Draw a well labeled diagram of a monomeric antibody. (4 marks)
- b) Explain how the following soluble mediators act to protect the body from invading microorganisms:
- i) The complement system (6 marks)
 - ii) Interferons (5 marks)
 - iii) Lymphokines (5 marks)
- c) Name the classes of immunoglobulins. (5 marks)

[TOTAL MARKS = 25]

QUESTION 5

Explain the following:

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

[TOTAL MARKS = 25]

QUESTION 6

- a) Demonstrate that specific immunity arises from the cooperation of lymphocytes and macrophages. (4 marks)
- b) Briefly describe the following:
- (i) complete antigen (3 marks)
 - (ii) incomplete antigen (3 marks)
 - (iii) partial antigen (3 marks)
- c) What is an anaphylaxis? Elaborate. (5 marks)
- d) Define the term "cellular immunity" (3 marks)
- e) Explain how T cells react against viruses inside cells. (4 marks)

[TOTAL MARKS = 25]

[END OF QUESTION PAPER]