

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER: MAY 2013

TITLE OF PAPER: MICROBIOLOGY AND IMMUNOLOGY

COURSE CODE: B404

TIME ALLOWED: THREE HOURS

INSTRUCTION: 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

SPECIAL REQUIREMENTS: NONE

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

Question 1

- a) Indicate the practical application of negative staining (1 mark)
- b) Why is capsule staining a differential staining technique? (1 mark)
- c) Indicate the Gram's reaction of the following microorganisms: *Mycobacterium*, *Haemophilus*, *Staphylococcus*, *Corynebacterium*, *Klebsiella*, *Neisseria*, *Clostridium*, *Bacillus*, *Escherichia*, *Salmonella*, *Shigella* and *Vibrio* spp. (6 marks)
- d) Name one disease caused by each of the microorganisms listed in (c) above. (6 marks)
- e) Name two examples of tumor viruses. (1 mark)
- f) List some methods that are employed in viral detection within tissues. (2 marks)
- g) What is the role of dipicolinic acid in bacterial sporogenesis? (1 mark)
- h) List the conventional methods that are employed in typing bacteria? (2 marks)
- i) Name the classes of immunoglobulins. (1 mark)
- j) Give a list of a generalized sequence of the stages of microbial infection. (2 marks)
- k) Make a clear distinction between natural and semisynthetic penicillins. (2 marks)

[Total Marks = 25]

Question 2

- a) Explain how the soluble mediators of non-specific host resistance act to protect the body from potential pathogens. (15 marks)
- b) Write an essay on malignant transformation by tumor viruses. (10 marks)

[Total Marks = 25]

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Question 3

Write a microbiography of any of the following in terms of its important properties, pathogenesis and disease prevention.

- a) *Escherichia coli*
- b) Influenza virus
- c) *Staphylococcus spp*
- d) *Streptococcus pyogenes*

[Total Marks = 25]

Question 4

- a) Demonstrate that specific immunity arises from the cooperation of various cells of the immune system (4 marks)
- b) Briefly, give a description of the types of antigens we encounter in the environment we live in. (9 marks)
- c) Explain the mechanism behind anaphylaxis. (5 marks)
- d) Cite some examples of graft acceptance and rejection. (3 marks)
- e) Explain how T cells react against viruses inside cells. (4 marks)

[Total Marks = 25]

Question 5

Write an essay on the following:

- a) Virus - cell interactions (12.5 marks)
- b) Viral pathogenesis. (12.5 marks)

[Total Marks = 25]

Question 6

- a) Indicate the importance of stem cell research for the improvement of human health. Is this venture ethically acceptable? Elaborate. (5 marks)
- b) Explain the role of B and T cells in specific host resistance. (15 marks)
- c) Explain the concept of immunologic memory. (5 marks)

[Total Marks = 25]