

# UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

Department of Environmental Health Sciences

Supplementary Examination 2011/2012

TITLE OF PAPER : INTRODUCTION TO MICROBIOLOGY AND IMMUNOLOGY  
COURSE CODE : HSC 105  
DURATION : 3 HOURS  
INSTRUCTION : READ THE QUESTIONS & INSTRUCTIONS CAREFULLY.

THIS PAPER IS DIVIDED INTO TWO SECTIONS:  
SECTION A (NURSING SCIENCE) &  
SECTION B (ENVIRONMENTAL SCIENCE).

ANSWER ANY FOUR QUESTIONS IN YOUR SECTION

EACH QUESTION CARRIES 25 MARKS.

NO PAPER SHOULD NEITHER BE BROUGHT INTO NOR  
TAKEN 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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## SECTION A (NURSING SCIENCE)

### Question 1

- a) Write an essay on the relevance of viruses to humans. (11 marks)
- b) What does A(HxNy) mean to you in the biology of influenza virus? (4 marks)
- c) Write an essay on "Influenza: crossing the species barrier". (10 marks)

[Total marks = 25]

### Question 2

- a) What is immunotherapy? (5 marks)
- b) Write an essay on B and T cells of the immune system. (20 marks)

[Total marks = 25]

### Question 3

- a) Human activities cause cancer other than the genetic and viral causes. Elaborate. (5 marks)
- b) Write an essay on viruses and cancer. (20 marks)

[Total marks = 25]

### Question 4

- a) What is serology? (3 marks)
- b) Explain the following:
- (i) Hypersensitivity type I (8 marks)
  - (ii) Functional names of antibodies (7 marks)
  - (iii) The effect of HIV on the immune system (7 marks)

[Total marks = 25]

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### Question 5

- a) What are penicillinases? What is their mode of action? (4 marks)
- b) List some examples of penicillins and tetracyclines. (5marks)
- c) How do antibiotics eliminate bacteria that have infected a human body? (10 marks)
- d) Explain how antibiotic resistance in bacteria arises. (6 marks)

**[Total marks = 25]**

### Question 6

- a) Why are antibodies called immunoglobulins? (3 marks)
- b) List the classes of antibodies (4 marks)
- c) What is immunologic memory in humans? Elaborate. (4 marks)
- d) Explain how antibodies are synthesized. (6 marks)
- e) Outline the characteristics of specific immune response. (4 marks)
- f) Under what circumstances is immunotherapy effected? Elaborate. (4 marks)

**[Total marks = 25]**

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### SECTION B – ENVIRONMENTAL SCIENCE

#### Question 7

- a) Draw a generalized bacterial growth curve and explain its phases. (15 marks)
- b) Discuss five physiological temperature groups of bacteria. (10 marks)

[Total marks = 25]

#### Question 8

- a) What characterizes mushrooms as:
- i) Fungi (3 marks)
  - ii) Basidiomycetes (3 marks)
- b) Briefly explain the occurrence of fungal diseases or mycosis. (5 marks)
- c) Illustrate a typical reproduction of a basidiomycete? Indicate the stage where dead forest trees are decayed. (14 marks)

[Total marks = 25]

#### Question 9

- a) What are the general characteristics of ascomycetes? (5 marks)
- b) List at least five factors that make ascomycetes economically important. (5 marks)
- c) Draw and label the following structures and state the families that produce them.
- i) Perithecium (3 marks)
  - ii) Apothecium (3 marks)
  - iii) Cleistothecium (3 marks)
  - iv) Ascostroma (3 marks)
  - v) Ascus (3 marks)

[Total marks = 25]

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### Question 10

Write an essay on innate immunity. For each body site, explain the adaptation and function of the microbes and name specific examples.

[Total marks = 25]

### Question 11

- a) Draw and label a generalized bacterial cell. (5 marks)
- b) Discuss the composition and function of the following bacterial components:
  - i) Cell wall (2 marks)
  - ii) Cell membrane (2 marks)
  - iii) Capsule (2 marks)
  - iv) Flagella (2 marks)
  - v) Nuclear material (2 marks)
- c) Explain how genetic variability in bacteria is brought about by a plasmid in conjugation. Illustrate your answer. (10 marks)

[Total marks = 25]

### Question 12

Discuss disinfection and sterilization procedures.

[Total marks = 25]

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