UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES

SUPPLEMENTARY EXAMINATION 2009/2010

TITLE OF PAPER: INTRODUCTION TO MICROBIOLOGY AND IMMUNOLOGY

COURSE CODE: HSC 105

DURATION: 3 HOURS

INSTRUCTIONS:

1. READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
2. THIS PAPER IS DIVIDED INTO **TWO** SECTIONS:-
   SECTION A (NURSING SCIENCE) &
   SECTION B (ENVIRONMENTAL SCIENCE)
3. ANSWER ANY FOUR QUESTIONS IN YOUR SECTION
4. EACH QUESTION CARRIES TWENTY FIVE (25) MARKS
5. NO PAPER SHOULD NEITHER BE BROUGHT INTO NOR TAKEN OUT OF THE EXAMINATION ROOM
6. BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER

SPECIAL REQUIREMENTS: NONE

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

SECTION A (NURSING SCIENCE)
Answer any four questions from this section.

Question 1

(a) Use your knowledge of virology to explain 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 = 25 marks]

Question 2

(a) What is immunotherapy? (5 marks)

(b) Write an essay on B and T cells of the immune system. (20 marks)

[Total = 25 marks]

Question 3

(a) What are the possible causes of cancer in humans? (6 marks)

(b) Write an essay on viruses and cancer. (20 marks)

[Total = 25 marks]

Question 4

(a) What is serology? (3 mark)

(b) Explain the following:
(i) anaphylaxis, (8 marks)
(ii) functional names of antibodies, (7 marks)
(iii) the effect of HIV on the immune system. (7 marks)

[Total = 25 marks]

Question 5

(a) What are penicillinases? What is their mode of action? (4 marks)

(b) List some examples of penicillins and tetracyclines. (5 marks)

(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 = 25 marks]

Question 6

(a) Why are antibodies called immunoglobulins? (3 mark)

(b) Name the classes of antibodies. (4 marks)

(c) What is immunologic memory? Elaborate. (4 marks)

(d) Explain the concept of antibody response. (4 marks)

(e) Outline the characteristics of specific immune response. (4 marks)

(f) Under what circumstances is immunotherapy effected? Elaborate. (4 marks)

[Total = 25 marks]

SECTION B (ENVIRONMENTAL SCIENCE)
Answer any four questions from this section.

Question 7

(a) Draw and fully label a generalised bacterial growth curve. (6 marks)

(b) Explain the phases shown in your growth curve in **7(a)** above. (4 marks)

(c) Explain five methods of sterilisation. (10 marks)

(d) List the factors that influence the effectiveness of disinfection. (5 marks)

[Total = 25 marks]

Question 8

(a) Explain chromosomal recombination in bacteria when the donor DNA is
(i) double stranded, (2 marks)
(ii) single stranded. (3 marks)

(b) How was transformation in bacteria discovered? Outline the series of experiments done and explain the results. (10 marks)

(c) List ten ways in which microbes affect human welfare. (10 marks)

[Total = 25 marks]

Question 9

(a) Prepare a table to compare the four major groups of terrestrial fungi against the following criteria: mycelium, asexual spores and sexual spores. (15 marks)

(b) Explain the following terms about fungal pathogenicity:
(i) toxins, (4 marks)
(ii) mycoses. (6 marks)

[Total = 25 marks]

Question 10

(a) Draw the various growth patterns of microbes in a test tube and define their classification by oxygen requirement. (10 marks)

(b) Compare fungi and bacteria using five characteristics. Present your answer in tabular form. (5 marks)

(c) Explain the useful contributions of microbes in industry. (5 marks)

[Total = 25 marks]

Question 11

(a) With the aid of diagrams and brief illustrations, explain the principal methods used in a municipal water purification plant, highlighting the role of microbes. (15 marks)

(b) When collecting water for bacteriological analysis, what steps should you observe? (10 marks)

[Total = 25 marks]

Question 12

(a) Why should environmental scientists study microbiology? (10 marks)

(b) List the characteristics you should use in identifying bacteria. (10 marks)

(c) Explain the following terms:
(i) antigen, (2 marks)
(ii) antibody. (3 marks)

[Total = 25 marks]

END OF EXAMINATION PAPER