

UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF ENVIRONMENTAL HEALTH SCIENCES

SUPPLEMENTARY EXAMINATION 2010/2011

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) Explain the relevance of viruses to humans. (11 marks)
- (b) What does A(HxNy) mean 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? (5 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) Hypersensitivity Type I, (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 marks)
- (b) Name the classes of antibodies. (4 marks)
- (c) What is anamnestic response in humans? Elaborate. (4 marks)
- (d) Explain the concept of antibody biosynthesis. (6 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