

UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

Department of Environmental Health Sciences and General
Nursing

Supplementary Examination 2013/2014

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.

SECTION A (NURSING SCIENCE)

Question 1

- a) Are all viruses pathogenic? What is their relevance to humans? (11 marks)
- b) What does A(HxNy) mean to you in the biology of influenza virus? (4 marks)
- c) Explain how influenza virus crosses the species barrier. (10 marks)

[Total marks = 25]

Question 2

- a) What is antibody therapy? (5 marks)
- b) Write an essay on the role of B and T cells in the human specific disease resistance. (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 the biology of cancer. (20 marks)

[Total marks = 25]

Question 4

- a) What is immunotherapy? (3 marks)
- b) Explain the following:
- (i) Hypersensitivity type I in humans (8 marks)
 - (ii) Classes of antibodies (7 marks)
 - (iii) How retroviruses skip the normal functions of the immune system. (7 marks)

[Total marks = 25]

Question 5

- a) What are B-lactamases? What is their mode of action? (4 marks)
- b) List some examples of B-lactam and antibiotics. (5marks)
- c) Explain the mode of action of antimicrobial agents. (10 marks)
- d) Cite some examples of clinically proven antibiotic resistance by bacteria. (6 marks)

[Total marks = 25]

Question 6

- a) Why are antibodies called immunoglobulins? (3 marks)
- b) List the characteristics of specific immune response. (4 marks)
- c) Why don't humans succumb to chicken pox virus frequently? (4 marks)
- d) Explain the mechanism behind antibody biosystems. (6 marks)
- e) Explain how T cells react with viruses within cells. (4 marks)
- f) Make a clear distinction between humoral and cellular immunity. (4 marks)

[Total marks = 25]

SECTION B – ENVIRONMENTAL SCIENCE

Question 7

- a) Explain endospore production in bacteria. (5 marks)
- b) Discuss the composition and function(s) of the following bacterial components.
 - i) Cell wall (2 marks)
 - ii) Cytoplasmic membrane (5 marks)
 - iii) Nuclear material (3 marks)
- c) Use illustrations to explain the role of the plasmid in the conjugation of an Hfr and an F⁻.
What are the products of the mating? (10 marks)

[Total marks = 25]

Question 8

- a) What is conjugation? (1 marks)
- b) What are the possible results of conjugation? (2 marks)
- c) What does a plasmid code for? (3 marks)
- d) What is an Hfr and how is it produced? Illustrate. (4 marks)
- e) What do you get when you mate an F⁺ and an F⁻? (2 marks)
- f) Prepare annotated diagrams of the mating of an Hfr with an F⁻ (10 marks)
- g) Why are the products of Hfr X F⁻ different from those of F⁺ X F⁻ when the genetic material in both matings is the same? (3 marks)

[Total marks = 25]

Question 9

- a) Write brief notes on the following:
 - i) mycoplasmas (5 marks)
 - ii) algae (5 marks)
 - iii) archaea (5 marks)
- b) Enumerate characteristics that are considered in virus classification. (10 marks)

[Total marks = 25]

Question 10

- a) Prepare a table to compare bacteria and fungi. Provide at least five points of comparison. (10 marks)
- b) What is innate immunity and how does it function in human beings? (15 marks)

[Total marks = 25]

Question 11

- a) Discuss the life cycle of a fungus of your choice (asexual and sexual processes). (15 marks)
- b) Discuss the economic importance of microbes to the environment. (10 marks)

[Total marks = 25]

Question 12

- a) Explain at least five methods of sterilization. (10 marks)
- b) What should one observe in citing a pit-latrine? (5 marks)
- c) How is municipal water made potable? (10 marks)

[Total marks = 25]