

UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

Department of Environmental Health Sciences

Final Examination 2017/2018

TITLE OF PAPER : INTRODUCTION TO MICROBIOLOGY AND IMMUNOLOGY
COURSE CODE : EHS 110
DURATION : 3 HOURS
MARKS : 100

INSTRUCTIONS :

- 1. ANSWER ANY FOUR QUESTIONS**
- 2. EACH QUESTION CARRIES TWENTY FIVE 25 MARKS.**
- 3. ILLUSTRATE YOUR ANSWER WITH LARGE AND CLEARLY LABELLED DIAGRAMS.**
- 4. BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.**

SPECIAL REQUIREMENTS: NONE

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATORS.

Question 1

a) Draw and give examples (e.g. *Vibrio*, *Vibrio spp*) of the following:

- (i) A spiral
- (ii) A bacillus
- (iii) A coccus
- (iv) A spirochaete
- (v) A streptobacillus
- (vi) A staphylococcus

(6 marks)

b) Match the structures in column A to their functions in column B

(8 marks)

Column A

- a) Cell wall
- b) Endospore
- c) Fimbriae
- d) Flagella
- e) Glycocalyx (capsule)
- f) Pili
- g) Plasma membrane
- h) Ribosomes

Column B

- 1. Attachment to surfaces
- 2. Cell wall formation
- 3. Motility
- 4. Protection for osmotic lysis
- 5. Protection from phagocytes
- 6. Resting
- 7. Protein synthesis
- 8. Selective permeability
- 9. Transfer of genetic material

c) Why is an endospore called a resting structure?

(3 marks)

d) Explain how gram-positive and gram negative cell walls differ.

(3 marks)

e) Given that the optimal conditions for bacterial growth are never met, draw and explain the logistic (generalized growth) curve of an *E.coli*

(5 marks)

Question 2

- a) What is a virus? (2 marks)
- b) List and draw the morphological classes of viruses. (4 marks)
- c) Explain the replication cycle of a typical virus. (6 marks)
- d) Describe any viral disease of your choice. (13 marks)

(TOTAL MARKS = 25)

Question 3

- a) Where do the cells of the immune system originate? (1 mark)
- b) Show the sequence of events on how the innate and adaptative immune cells are produced. Use the **following format as a guide to your response.** (10 marks)

Innate immunity

1. Bone marrow
2. ?
3. Myeloid progenitor
4. Erythrocytes
5. ?
6. Leucocytes
7. ?
8. ?
9. ?
10. ?
- 11.
- 12.

Adaptative immunity

1. ?
2. Multipotent hematopoietic cell
3. ?
4. ?
5. B lymphocytes
6. ?
7. ?
8. ?
- 9.
- 10.

- c) B cells produce antibodies that bind antigens. Explain the role of B cells in specific host resistance to human pathogens. (9 marks)
- d) Write an essay on the concept of vaccines. (5 marks)

(TOTAL MARKS = 25)

Question 6

- a) The complement system works in an interactive manner. Make an outline of the major biological activities of the complement system. (4 marks)
- b) Explain the cellular and physiological mechanisms behind anaphylaxis (anaphylactic hypersensitivity). (5 marks)
- c) Identify what are Tc, Th and Ts cells and explain how these cells work against viral infections. (10 marks)
- d) Auto immunity does not always result in diseases but a number of autoimmune diseases are common. Mention some examples of autoimmune diseases. (6 marks)

(TOTAL MARKS = 25)

END OF QUESTION PAPER