

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS.

EXAMINATION FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE IN
MICROBIOLOGY AND BIOTECHNOLOGY

BOTA 832: MICROBIAL PHYSIOLOGY

STREAMS: MSC

TIME: 3 HOURS

DAY/DATE: WEDNESDAY 5/12/2018

8.30 A.M -11.30 A.M

INSTRUCTIONS:

- Answer Question ONE (COMPULSORY) and any other TWO Questions.
- Candidates are advised not to write on question paper
- Candidates must hand in their answer booklets to the invigilator while the in the examination room

QUESTION ONE: [20 MARKS]

- (a) The cell wall of gram positive bacterial may contribute to septic shock. Use a diagram to explain the differences between the cell wall of gram positive and gram negative bacteria. [4 Marks]
- (b) State the principal features of the cell surface structures flagella pili. [4 Marks]
- (c) Discuss the strategies used by bacteria to cope with variation in gaseous oxygen. [4 Marks]
- (d) Compare the genetic organization between eukaryotes and prokaryotes. [4 Marks]
- (e) Distinguish between chemoheterotroph and chemoutotroph bacteria using examples. [4 Marks]

QUESTION TWO: [20 MARKS]

- (a) Classify microbiological culture media based on their chemical composition. [4 Marks]
- (b) Name the selective agent in the following culture media:
- (i) Eosin-methylene blue agar
 - (ii) Lowenstein-Jasnstein agar
 - (iii) Sabaroud's agar
 - (iv) Mannitol salt sugar [4 Mark]

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- (c) Explain how bacteria obtain and utilize nitrogen sources of nutrition. [4 Marks]
- (d) Explain the following techniques of sterilization of microbiological culture media and equipment:
 - (i) Ethylene oxide gas
 - (ii) Bacteriological filters
 - (iii) Ultra-violet radiation
 - (iv) Autoclaving [4 Marks]

QUESTION THREE: [20 MARKS]

- (a) State three unique properties of viruses. [3 Marks]
- (b) Use diagrams to explain three types of viral capsids. [3 Marks]
- (c) State two adaptive advantages of HIV metabolism to its survival. [2 Marks]
- (d) Distinguish between the modes of release of enveloped and non-enveloped viruses. [2 Marks]
- (e) Discuss the process of virus multiplication. [10 Marks]

QUESTION FOUR: [20 MARKS]

- (a) Define the term 'generation time' in bacteria. [3 Marks]
- (b) Describe bacterial conjugation and state its significance. [3 Marks]
- (c) Discuss bacterial growth in a closed growth system. [12 Marks]

QUESTION FIVE: [20 MARKS]

- (a) State the significance of ATP in microbial metabolism. [2 Marks]
 - (b) State the roles of the following enzymes in the tricarboxylic acid cycle
 - (i) Aconitase [2 Marks]
 - (ii) α -ketoglutarate hydrogenase [2 Marks]
 - (iii) Fumarases [2 Marks]
 - (iv) Succinate dehydrogenase [2 Marks]
 - (c) Outline the steps in ATP generation from glucose. [10 Marks]
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