



MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FIRST YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF ENVIRONMENTAL SCIENCES

ENS 132: ENVIRONMENTAL BIOLOGY

DATE: 24/9/2019

TIME: 2.00-4.00 PM

INSTRUCTIONS

1. Answer Question 1 (compulsory) and **any two** questions in Section B.
2. Use clean well labelled diagrams wherever appropriate.

SECTION A

QUESTION ONE

- a) Give names and structures of three essential amino acids (3 marks)
- b) Why do two forms of sleeping sickness exist? How do they differ? (3 marks)
- c) Briefly describe neurulation as an event in organogenesis and the importance in establishing the body plan. (3 marks)
- d) Explain the biochemical principles of the following biochemical techniques:
 - i. Column chromatography (2 marks)
 - ii. Electrophoresis (2 marks)
 - iii. Spectrophotometry (2 marks)
 - iv. Precipitation (2 marks)
- e) Illustrate a simple structure of a triglyceride and indicate the position of an ester bond (3 marks)
- f) Based on the monomeric units, distinguish the three classes of carbohydrates. (3 marks)
- g) Describe the quaternary level of proteins with an appropriate example (3 marks)

- h) Why is the hydrophilic end of phospholipids attracted to water? (2 marks)
- i) What is ATP and how does it function in cells? (3 marks)
- j) Discuss major functions of lipids in cells. (3 marks)

QUESTION TWO

Give an account of the catabolic pathway of glucose in the presence of oxygen (20 marks)

QUESTION THREE

- a) Describe the lifecycle of plasmodium spp (10 marks)
- b) Differentiate between amastigote, promastigote, epimastigote, and trypomastigote and indicate which stages are infectious to humans (10 marks)

QUESTION FOUR

Illustrate Cleavage, Gastrulation and Neurulation using relevant models (20 marks)

QUESTION FIVE

- a) Discuss the following disaccharides and give structural illustration of how they are formed from their respective monosacchrides.
 - i. Lactose (5 marks)
 - ii. Sucrose (5 marks)
- b) Give a detailed description of polysaccharides (10 marks)