



MACHAKOS UNIVERSITY

University Examinations 2017/2018

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

THIRD YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN BIOLOGY

BACHELOR OF EDUCATION

SZL 312: LIMNOLOGY

DATE: 19/12/2017

TIME: 2.00-4.00 PM

INSTRUCTIONS

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

SECTION A COMPULSORY (30 MARKS)

1. a) i Distinguish between laminar and turbulent flows (2 marks)
ii Outline the significance of water movement in lakes (2 marks)
- b) Define thermocline and explain its significance in a lake's ecosystem (2 marks)
- c) Outline
 - i. two (2) factors that affect light penetration in lentic ecosystems (2 marks)
 - ii. the significance of phylum annelida in aquatic systems (2 marks)
 - iii. two (2) adaptations of organisms in the lower reaches of rivers (2 marks)
- d) A group of Limnology students collected water samples from the open waters of lake Naivasha and identified the organisms in the water samples.
 - i. Name two species of phytoplankton and two species of zooplankton they are likely to find in these water samples. (2 marks)
 - ii. Outline two (2) ways in which these organisms are adapted to life in their environment (2 marks)
- e) Give reasons to explain:
 - i. The high benthic community in estuarine environments (2 marks)

- ii. The high numbers of organisms in mid water streams compared to head water streams and down water streams (2 marks)
- f) Some aquatic ecology students determined the depth - oxygen profile in two lakes (A and B). Lake A was located within a highly populated environment with lots of domestic, agricultural and industrial activities within its watershed. Lake B was located in a flat dry area with little rainfall, poor soils and hence scarce settlements and little human activities.
 - i. By use of diagrams, illustrate the likely depth-oxygen curves in lake A and B. (2 marks)
 - ii. Give reasons to explain the shape of each curve (2 marks)
- g) Describe three (3):
 - i. Characteristics of a lotic system (3 marks)
 - ii. Negative effects of aquatic weeds to aquatic ecosystems (3 marks)

SECTION B

- 2. Describe how organisms are adapted to the conditions of life in lotic systems (20 marks)
- 3.
 - a) Describe thermal stratification (7 marks)
 - b) Compare and contrast thermal stratification in temperate and tropical lakes (13 marks)
- 4.
 - a) Describe the ecological zonation of a fresh water lake (9 marks)
 - b) Discuss the importance of each zone to the lake ecosystem (11 marks)
- 5. Discuss the role of man in the deteriorating aquatic conditions in Lake Victoria (20 marks)