



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

**SECOND YEAR SECOND SEMESTER EXAMINATION FOR
BACHELOR OF EDUCATION (SPECIAL NEEDS EDUCATION)**

BACHELOR OF EDUCATION (SCIENCE)

BACHELOR OF SCIENCE (BIOLOGY)

SZL 202: COMPARATIVE PHYSIOLOGY

DATE: 31/5/2022

TIME: 2.00-4.00 PM

INSTRUCTIONS

Question one and any other two questions

QUESTION ONE (30 MARKS)

- a) Differentiate between
 - i. Book lungs and ventilation lungs (2 marks)
 - ii. Iso-osmotic organisms and osmo-conformers (2 marks)
- b) Explain
 - i. How mosquitoes are adapted for acquisition of food (2 marks)
 - ii. Two mechanisms of protection of the lining of digestive tracts (2 marks)
- c) Describe three mechanisms by which digestion in mammals is regulated (3 marks)
- d) Outline three
 - i. Osmoregulatory adaptations in terrestrial amphibians (3 marks)
 - ii. Challenges faced by terrestrial animals that have cutaneous respiration (3 marks)
- e) Describe the mollusc circulatory system (4 marks)
- f) Describe a functional classification of neurons (3 marks)
- g) Outline three reproductive differences between birds and mammals (3 marks)
- h) Describe three adaptations of endotherms to cold temperature (3 marks)

QUESTION TWO (20 MARKS)

Compare and contrast respiratory adaptations in the vertebrates

QUESTION THREE (20 MARKS)

- a) By use of a well labelled diagram, illustrate the structure of the elasmobranch circulatory system. (8 marks)
- b) Giving examples, describe the evolution of circulatory systems in animals. (12 marks)

QUESTION FOUR (20 MARKS)

- a) Describe the structure of the mammalian nervous system (10 marks)
- b) Discuss the evolution of the nervous system in animals (10 marks)

QUESTION FIVE (20 MARKS)

Explain

- a) osmotic challenges encountered by animals in their diverse environments (9 marks)
- b) Mechanisms by which terrestrial organisms are able to maintain osmotic balance in their environments (11 marks)