



MACHAKOS UNIVERSITY

University Examinations 2016/2017

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

**FOURTH YEAR FIRST SEMESTER EXAMINATION FOR
BACHELOR OF EDUCATION (SCIENCE)**

SZL 409: ENVIRONMENTAL PHYSIOLOGY

DATE: 31/7/2017

TIME: 2:00 – 4:00 PM

INSTRUCTIONS

Answer Question One and Any Other Two Questions

1.
 - a) Explain what homeostasis is and outline its significance in the life of an animal (2 marks)
 - b) Differentiate between isosmotic organisms and osmo-conformers (2 marks)
 - c) Explain how cartilaginous fishes are able to have plasma that is approximately iso-osmotic to sea water (3 marks)
 - d) Explain why terrestrial animals chose to incur more energy cost to excrete their nitrogenous wastes in form of urea rather than less costly ammonia (3 marks)
 - e) Describe three (3) mechanisms adopted by endotherms to save on energy costs of thermoregulation (3 marks)
 - f) Explain three mechanisms by which amphibians are adapted to life at the Kalahari desert. (3 marks)
 - g) Explain why breathing is more costly for aquatic animals than for terrestrial animals (2 marks)
 - h) Explain how vertebrates living in high altitude environments are adapted to continued efficiency in respiration. (3 marks)
 - i) Describe three (3) animal adaptations to seasonal changes in diet (3 marks)

- j) Explain how the bird respiratory system is adapted to function in an aerial environment (3 marks)
- k) Explain how the environment affects reproduction in animals (3 marks)
- 2. a) Outline the meaning of homeostatic regulation and explain its principle mechanism of operation. (5 marks)
- b) Explain how homeostatic regulation works to maintain thermal homeostasis among endotherms living in different environments. (15 marks)
- 3. a) Describe the following in vertebrates living in various environments
 - i Reproductive adaptations (10 marks)
 - ii Digestive adaptations (10 marks)
- 4. Discuss the following
 - 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)
- 5. Discuss the following
 - a) Respiration mechanisms in animals (15 marks)
 - b) Factors affecting respiration in animals (5 marks)