MACHAKOS UNIVERSITY

University Examinations 2019/2020 academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN BIOLOGY

SZL 409: ENVIRONMENTAL PHYSIOLOGY

DATE: **TIME:**

INSTRUCTIONS

Answer question one and any other two questions

QUESTION ONE

a) Define homeostasis and outline its significance in the life of an animal (2 marks)

b) Differentiate between isosmotic organisms and osmo-conformer (2 marks)

c) Explain how cartilagenous 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)

QUESTION TWO

a) Define homeostatic regulation and explain its principle mechanism of operation (5 marks)

b) Explain how homeostatic regulation works to maintain thermal homeostasis in endotherms living in various environments (15 marks)

QUESTION THREE

Describe the following in vertebrates living in various environments

a) Reproductive adaptations (10 marks)

b) Digestive adaptations (10 marks)

QUESTION FOUR

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)

QUESTION FIVE

Discuss

a) Respiration mechanisms in animals (15 marks)

b) Factors affecting respiration in animals (5 marks)