



TECHNICAL UNIVERSITY OF MOMBASA

School of Applied and Health Sciences
DEPARTMENT OF ENVIRONMENT AND HEALTH SCIENCES
UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN FISHERIES AND OCEANOGRAPHY (BSFO 2023S)

AFO 4207: AQUATIC VERTEBRATE ZOOLOGY

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: JULY 2025 SERIES

TIME: 2 HOURS

DATE: JULY 2025

Instructions to Candidates

You should have the following for this examination

Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt **question ONE (Compulsory) and any other TWO questions.**

Do not write on the question paper.

Question One (25 Marks)

- a) Explain the role of the following structures to the aquatic animals that possess them
 - i) Chromatophores (2 marks)
 - ii) Swim bladder (2 marks)
- b) Using examples, name the living sub-classes under the class Reptilia (3 marks)
- c) Explain the utility of the lymphatic system in vertebrates (3 marks)
- d) Using examples, differentiate between Aestivation and Hibernation in vertebrates (4 marks)
- e) Outline the principles of a terrestrial vertebrate respiratory system (4 marks)
- f) The evolution of aves required adaptive radiation for arboreal life. Outline major features that were acquired for this kind of life (4 marks)
- g) Outline the demerits of sexual reproduction in vertebrates (4 marks)
- h) Outline how the mammalian skin is adapted to thermoregulation (4 marks)

Question Two (25 Marks)

Explain the various adaptations to life in the bony fishes (20 marks)

Question Three (25 Marks)

Aves are the most diverse group of vertebrates that have ever evolved.

- a) Outline the major adaptive modifications of birds that have led to their success in their environments (8 marks)
- b) Describe the modifications of birds' beaks to their mode of feeding (7 marks)
- c) Many birds employ the counter-current heat exchange mechanism to deal with challenges of temperature changes in the environment. Discuss how this system works (5 marks)

Question Four (25 Marks)

- a) Describe the classification of aquatic mammals based on type of digestive system they possess (14 marks)
- b) Outline the functions of the blood tissue in animals (6 marks)

Question Five (25 Marks)

- a) Describe the breathing process in the following aquatic vertebrate groups
 - i) Amphibians (4 marks)
 - ii) Mammals (6 marks)
- b) Explain the adaptations of reptiles to acquisition of respiratory gases (10 marks)