



TECHNICAL UNIVERSITY OF MOMBASA

School of Applied and Health Sciences
DEPARTMENT OF PURE AND APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN MARINE SCIENCES RESOURCE MANAGEMENT
(BSMR 24S)

AES 4103: INTRODUCTION TO ZOOLOGY

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: MARCH 2025 SERIES

TIME: 2 HOURS

DATE: MARCH 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 (30 marks)

- a) Explain the following terms,
- i) Bilateral symmetry (1 mark)
 - ii) Metagenesis (1 mark)
- b) Explain the function of the following structures in invertebrates;
- i) Parapodia (1 mark)
 - ii) Flame cells (1 mark)
 - iii) Gastrovascular cavity (1 mark)
 - iv) Pinacocytes (1 mark)
- c) Arthropods are believed to be more advanced than Annelids. State **Three** (3) features which signify this (3 marks).
- d) Outline three (3) key characteristics of vertebrates (3 marks)
- e) Explain the relationship between phylogenetic trees and the fossil records (2 marks)

- f) Explain the importance of the following in the evolution of vertebrate fishes
- i) Fins (2 marks)
 - ii) Swim bladder (2 marks)
 - iii) Lateral line (2 marks)
- f) Using examples, name the living groups in the Class Reptilia (3 marks)
- g) Explain how the evolution of skeleton and muscles enabled flight in birds (3 marks)
- h) Outline the forms of sexual reproduction in vertebrates (3 marks)

QUESTION TWO

- a) The Geologic Time Scale outlines times for major events in the evolution of animals. Outline the major events associated with the following in relation to evolution of vertebrates
- i) Mesozoic Era (2 marks)
 - ii) Cenozoic Era (3 marks)
- b) State the limitations of using fossil records in explaining vertebrate evolution (3 marks)
- c) Explain the major events involved in the evolution of invertebrates (12 marks)

QUESTION THREE

Describe the various adaptations to life in the bony fishes under the following headings

- a) Anatomical adaptations (14 marks)
- b) Physiological adaptations (6 marks)

QUESTION FOUR

- a) Giving examples, state six (6) key adaptive characteristics of invertebrates (6 marks)
- b) Using examples, differentiate between Protostomous and Deutrostomous animals (10 marks)
- c) Describe the various modifications of scales in bony fishes (4 marks)

QUESTION FIVE

- a) Using examples, explain the term Adaptive radiation (2 marks)
- b) Describe at least THREE distinguishing features in each of the groups of mammals below
 - i) Prototheria (3 marks)
 - ii) Theria (3 marks)
 - iii) Metatheria (3 marks)
 - iv) Eutheria (3 marks)
- c) Outline the three main patterns of sexual reproduction demonstrated in vertebrates (6 marks)