



TECHNICAL UNIVERSITY OF MOMBASA

School of Applied and Health Sciences
DEPARTMENT OF PURE AND APPLIED SCIENCES
UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN MOLECULAR BIOLOGY AND FORENSIC TECHNOLOGY

AFR 4403: FORENSIC ENTOMOLOGY

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2024 SERIES

TIME: 2 HOURS

DATE: DECEMBER 2024

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) Define the following terms as used in Forensic Entomology
 - i) Post mortem interval (PMI) (1 mark)
 - ii) Minimum time since colonization" (1 mark)
 - iii) Upper development threshold (UDT) (1 mark)
- b) Outline the subfields of Forensic entomology (3 marks)
- c) Outline the contribution of Song Ci in Forensic Entomology (3 marks)
- d) Explain the main methods of using insects to determine elapsed time since death (4 marks)
- e) Outline the information a forensic entomologist should know in order to determine minimum PMI (3 marks)
- f) Explain the role of the following insect groups in forensic entomology
 - i) Phorid flies (1 mark)
 - ii) Tineidae (Cloth moths) (2 marks)
- g) Formicidae are an important group of insects in forensic entomology but exhibit behavior that may affect the pace of the decomposition process, the normal succession

of insects on the carcasses, and therefore the estimation of the minimum postmortem interval. Explain this behavior (4 marks)

- h) Explain the influence of temperature of decomposition of animal carrion (4 marks)
- i) Explain the application of Mitochondrial DNA as a method of providing forensic evidence (3 marks)

Question Two (25 Marks)

Discuss the behavior and application of the following Sarcosaprophagous insect families in Medico-legal Forensic investigations

- a) Calliphoridae (5 marks)
- b) Sarcophagidae (5 marks)
- c) Muscidae (5 marks)
- d) Dermestidae (5 marks)

Question Three (25 Marks)

Describe the typical life stages a sarcophagid blowfly (20 marks)

Question Four (25 Marks)

- a) Outline the sampling sites for entomological information in Forensic Entomology (5 marks)
- b) Equipment recommended for the collection of insects and additional information at the scene (15 marks)

Question Five (25 Marks)

- a) Discuss the challenges of Forensic entomology as a tool in medico-legal cases (10 marks)
- b) Discuss how the following techniques have used in order to more accurately gather entomological forensic evidence or re-evaluate old information
 - i) Scanning electron microscopy (5 marks)
 - ii) Gene expression studies (5 marks)