



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

KST 301: AGRICULTURAL ENTOMOLOGY

DATE: 24/11/2020

TIME: 8.30-10.30 AM

INSTRUCTIONS:

Answer Question ONE and ANY other Two Questions

QUESTION ONE (30 MARKS)

- a) Differentiate between the importance of functional morphology in crickets and wasps showing how they adapt in varied ecologies. (4 marks)
- b) The fall armyworm pest, *Spodoptera frugiperda* can have five generations in the Rift Valley agro-climatic conditions. Explain the importance of the life-table data of fall armyworm pest on cereal crops in the Rift Valley. (6 marks)
- c)
 - i Insects have various growth types. Describe the type of growth of the tomato moth, *Tuta absoluta* on tomato plant showing the antagonistic factors occurring during the insect life-history stages. (4 marks)
 - ii In one farm in eastern Kenya a farmer found a cluster of 100 eggs on tomato growing flower buds of the plant. Name the possible pest and explain what procedure of threshold determination could be followed before implementing control measures. (4 marks)
- d) It is reported that the desert locust, *Schistocerca gregaria* live between 3-6 months where in a generation one female reproduces 50-70 eggs. Only 20 nymphs survive to adult from 70 eggs. Calculate the population density of nymphs that will survive into next generation from a 10 million swarm consisting of 5 million females in Northern Kenya. (6 marks)

- e) Maize is an important staple food in Kenya. Different pests lower maize yield. During the last rain season (March-May 2020) a farmer in Trans-Nzoia reported three different caterpillar pests; one cutting the young stems under soil cover, another cutting the silk on the ears and at harvest cob kernel damage and the third boring stems. Describe the possible three pests attacking the maize crop reported by the farmer. (3 marks)
- f) During a practical sampling session at Machakos University, the Entomology Class collected various insects. Describe THREE various beneficial insect groups that may have been collected by the class. (3 marks)

QUESTION TWO (20 MARKS)

- a) Explain SIX main insect Orders of economic importance in crop production in Kenya. (12 marks)
- b) Explain the importance of pest assessment before implementing control measures in integrated pest management systems. (8 marks)

QUESTION THREE (20 MARKS)

- a) Explain FIVE methods of controlling pests in crop production systems, elaborating on the advantages of the techniques. (10 marks)
- b) Explain TWO disadvantages of the FIVE pest management options in (a) above. (10 marks)

QUESTION FOUR (20 MARKS)

- a) Describe TWO examples of insect species of holometabolous and another TWO hemimetabolous metamorphosis, showing life stage cohorts. (4 marks)
- b) Explain the difference of the life stages of hemimetabolous and holometabolous insect species. (6 marks)
- c) Explain the roles of prothoracicotropic hormone (PTTH) in insect molting process. (10 marks)

QUESTION FIVE (20 MARKS)

- a) Assume you are a farm manager of a multinational company of tea farming in the Rift Valley of Kenya. A group of farmers from the neighbourhood have been invited to come and learn of the various skills of good agronomic practices of Crop Protection Principles. Outline the various steps of incorporating integrated approach. (8 marks)
- b) Pests on varied crops occur as (i) leaf defoliators, (ii) pod borers, (iii) stem borers and cell sap suckers. Citing some crop and pest examples, describe feeding behaviours showing mouth part characteristics of each FOUR groups. (12 marks)