



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF AGRICULTURAL AND FOOD SCIENCES**

**FOURTH YEAR FIRST SEMESTER UNIVERSITY EXAMINATION FOR DEGREE
OF BACHELOR OF SCIENCE IN NIMAL SCIENCE**

2017/2018 ACADEMIC YEAR

REGULAR

COURSE CODE: AAS 3415

COURSE TITLE: ANIMAL BREEDING

EXAM VENUE: LAB 17

STREAM: BSc. (Animal Science)

DATE: 20/12/17

EXAM SESSION: 2.00 – 4.00PM

TIME: 2.00 Hours

Instructions:

- 1. Answer ALL question in Section A (compulsory) and ANY other TWO questions in Section B.**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

SECTION A [30 MARKS]

Answer ALL questions from this Section.

Question 1

- a) Explain the following phenomena and show the relevance of each to practical animal breeding:
- i) Genotype X Environment interaction. (2 marks)
 - ii) Genotype - Environment correlation. (2 marks)
 - iii) Indirect response to selection. (2 marks)
 - iv) Pleiotropy is the main cause of genetic correlations between quantitative traits. (4 marks)

Question 2

Assume that selection is carried out separately among males and females in a herd of Kenya Boran cattle in which the average daily gain is 0.45 kg/day; and the means of selected males and females are 0.80 and 0.60 g/day, respectively.

- a) Calculate the average selection differential in kg/day when both males and females are selected. (3 marks)
- b) Repeat (a) above when males only are selected. (3 marks)
- c) By what amount (%) has the potential genetic gain been reduced by selecting for males only? (4 marks)

Question 3

- a) Differentiate between family and within family selection. (3 marks)
- b) What are the main limitations of family selection? (5 marks)
- c) Under what conditions is family selection recommended? (2 marks)

SECTION B [40 MARKS]

Answer ANY TWO questions from this Section.

Question 4

- a) Explain the term progeny testing? (2 marks)
- b) Under what situations would progeny testing, as an aid to selection, be appropriate in livestock genetic improvement? (3 marks)
- c) Outline the procedure of progeny testing Scheme as operated by the Kenya National Dairy Cattle Breeding Programme for AI Bulls. (15 marks)

Question 5

Discuss the factors affecting the magnitude of genetic response to selection per year. (20 marks)

Question 6

- a) Differentiate between the following:
 - i) Direct response and indirect response to selection. (2 marks)
 - ii) Rotational crossbreeding and up-grading. (2 marks)
 - iii) Identity in state and identity by descent of two alleles at a locus. (2 marks)
 - iv) Sire family and dam family. (2 marks)
 - v) Individual selection and combined selection. (2 marks)
- b) Data from experimental dairy herd was divided into two groups of high and low yielding cows. The high yielding cows produced 450 kg of butterfat, while low yielding cows produced 390 kg. Their daughters produced 385 kg and 367 kg, respectively. Breed average bulls were used randomly on all cows. Estimate heritability of butterfat yield. (10 marks)

Question 7

- a) Schematically present and discuss the general structure of livestock breeding industry. (12 marks)
- b) What are breeding objectives? Discuss factors that may distort breeding objectives. (8 marks)