UGANDA MARTYRS UNIVERSITY
FACULTY OF AGRICULTURE

Supplementary / Special Examinations 2015-2016
Exam: ANIMAL BREEDING AND GENETICS
Time: 10:00am – 01:00pm (3 Hrs)
Date: 05th August 2015

Instructions:

i.   *Attempt any 4 questions*
ii. *Write clearly, number the questions appropriately on the answer booklet*
iii. *Read and understand the instructions on the last page of the answer booklet*
iv. *Do not write anything on a question paper*

1a. List five genetic options which can be used to cause livestock genetic change (5 marks)

1b. Discuss 5 structural constraints of livestock improvement program in a developing country like Uganda (10 Marks)

1c. In your opinion can genetic improvement of dairy cows at the University farm lead to increased milk production? (Explain in details scientific reasons for your opinion)(5 marks)

2a. Write short notes on the following terms

   i.   Compound traits (4 marks)
   ii. Quantitative traits (3 marks)
   iii. Qualitative traits (3 marks)

2b. Name one statutory organization responsible for promoting improvement of livestock genetics in Uganda (2 marks)

2c. Discuss systematically the process of collecting and processing bovine semen in Uganda (8 marks)

3a. As an animal breeder you are asked to design a beef improvement program at the University farm. List five major criterions you will use to select the beef animals that will be recruited in your program (10 marks)

3b. State Hardy Weinberg's law (1 mark)

3c. Suppose RR represents $C^R C^R$ RW represents $C^R C^W$ and WW represents $C^W C^W$ and assuming a flock consists of 80 RR 90 RW and 20 WW hens,

   i.   Calculate the phenotypic frequency of RR, RW and WW (3 marks)

   ii. Calculate the genotypic frequencies of RR, RW and WW (3 marks)

   iii. Calculate the gene frequencies of R and W (3 marks)

4a. Discuss the following terms related to population genetics

   a. Epistasis (5 marks)

   b. Partial dominancy (5 marks)

4b. Define the term domestic Animal diversity (DAD) (4 marks)

4c. Briefly explain 3 reasons why maintaining high levels of domestic animal diversity is Important

5a. Discuss three effects of diseases on the rate of any genetic progress to be made in a breeding program (6 marks)

5b. Explain any five causes with an elaborate description of genetic erosion in domestic animals (10 marks)

5c. List three methods that can be used to conserve (protect) animal breeds which are at risk of being eroded (3 marks)

5d. Mention six short comings of the methods used to conserve animal breeds which are at risk of being eroded (6 marks)

6a. The farm manager at EVF is intending to select pigs with a decreased back fat thickness and the heritability (h2) of back fat thickness is 0.8, the mean back fat thickness of all boars is 1.4 inches and the mean back fat thickness for gilts is 1.6 inches. In addition, the mean back fat thickness of boars selected to be replacements is 0.9 inches and the mean back fat thickness of gilts to be replacements is 1.2 inches. Boars at EVF starting breeding at 8 months and gilts start breeding at 6 months. Boars are kept for 2 years and gilts (sows) are kept for 3 years. The litter index at EVF is 2 (i.e. in a year the sow farrows twice)

   i.   Calculate the overall herd mean (average) back fat thickness (2 marks)

   ii.   Compute the genetic response in inches from selection per generation (8 marks)

   iii.   Calculate the new back fat thickness herd mean (2 marks)

   iv.   Calculate the genetic response in inches from selection per year (4 marks)

6b. Why are maternal effects when comparing cross bred animals with pure bred animals important? (5 marks)

6c. Briefly explain four benefits of in breeding to a livestock seed producer (4 marks)

7a. Discuss five policy recommendations of safe guarding domestic animal diversity (10 marks)

7b Explain any five contribution of domestic animals to livelihood security in the south (developing countries) (10 marks)

7c. List five reasons why it is important to maintain high levels of domestic animal diversity (5 marks)

8a. What is meant by a breeding program? (5 marks)

8b. Describe how would design a breeding program for improving goats in Karomoja (20 marks)

9. A farmer wishes to increase 90 day weight in sheep. Flock mean is 40 kg. The heritability is 0.35. The standard deviation is 5 pounds. The farm uses the ram for only one year (when they are one year old) and he keeps ewes for an average of 4 lambings (beginning when they are one year old).The farmer selects 15% of the ewe lambs and 3% of the ram lambs as replacements

a. What is the average selection differential in standard deviation units?(5 marks)

b. What is the average selection differential in actual units?(4 marks)

c. What is the average generation interval?(4 marks)

d. What proportion of the variation is due to additive gene effects? (4 marks)

e. What is the response per generation?(4 marks)

f. What is the response per year?(4 marks)

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4c. Briefly explain 3 reasons why maintaining high levels of domestic animal diversity is Important

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