FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI

DEPARTMENT OF ANIMAL SCIENCE AND TECHNOLOGY

2008/2009 HARMATTAN SEMESTER EXAMINATIONS

AGR 303: AGRICULTURAL GENETICS

INSTRUCTION: ANSWER ANY 5 QUESTIONS AT LEAST ONE FROM EACH SECTION.

TIME ALLOWED: 3HRS.

SECTION A.

1. Differentiate between the following terms with appropriate illustrations.

i. Phenotype and Genotype
ii. Homozygote and heterozygote
iii. Dominant gene effect and Recessive gene effect.
iv. Alleles and Chromosomes

2a. Describe the role of three different areas of genetics.

b. Give a brief account of the various theories of inheritance put forward before 1900?

3. Using illustrative examples write short notes on five of the following;

i. Linkage and Crossover
ii. Sex linkage
iii. Epistasis
iv. Incomplete dominance.
v. Law of segregation and independent assortment.

SECTION B.

1a. Given the following base sequence in the DNA template below, identify the mRNA and tRNA codons and anticodons respectively.

DNA: TCG AAG TAC AGA CTT GCC TCC CTG

b. Why do individuals have considerable phenotypic variation among themselves?

2a. Define the term Population in the 'genetic sense'.

b. Given the MN blood group frequencies in some Nigerian population below.

	Blood Group		
	MM	MN	NN
Yoruba (%)	25.64	43.59	30.77
Number of individuals	20	34	24
Fulani (%)	25.84	49.44	24.72
Number of individuals	23	44	22

Estimate the gene frequency of the M and N blood groups respectively.

c. Assuming that in a herd of 100 short horned cattle, 50 are red, 40 are roan and 10 are white. What are the frequencies of the red and white gene?

SECTION C

1a. What are the basic concept of quantitative genetics.

b. Outline five statistical tools used in quantitative genetics

c. Distiguish the various methods of selection

d. List three objectives of selection.

2a. Distinguish between the various methods of selection

b. List three objective of selection

c. Mention two genetic consequences of selection.

SECTION D

1a. What is Transgenic Crops/Genetically Modified Organisms (GMOs)

b. State two reasons for making Transgenic Crops.

c. Define the following:
- Somaclonal variation
- Genetic Map
- DNA – Library
- Recombination
- Ligation
- Sequencing

2. Explain the following terms:

a. Tissue culture,
b. Embryo Culture, &
c. Biotechnology as a tool in crop improvement.
d. Gene, Genome, RNA and Synthetic DNA.