

**UNIVERSITY OF SWAZILAND
FACULTY OF AGRICULTURE**

DEPARTMENT: ANIMAL PRODUCTION AND HEALTH

FIRST SEMESTER EXAMINATIONS: 2004/2005

**DIPLOMA IN AGRICULTURE YEAR II, DIPLOMA IN AGRICULTURAL
EDUCATION YEAR II, REMEDIAL YEAR IN AGRICULTURE AND
REMEDIAL YEAR IN AGRICULTURAL EDUCATION**

COURSE CODE: APH 202

TITLE OF PAPER: PRINCIPLES OF GENETICS

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER ANY FOUR (4) QUESTIONS

**DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED BY
THE CHIEF INVIGILATOR.**

QUESTION 1

- a) Outline the contribution of genetics to human medicine. (5 marks)
- b) In pigs, lop ears is dominant to erect ears, and white skin is dominant to black skin. If pigs that are heterozygous with respect to both traits are mated and they produce 80 piglets, how many of these piglets are expected to be erect-eared, white skinned? (5 marks)
- c) Describe the physical properties of double-helical DNA. (5 marks)
- d) Write short notes on sex-limited traits. (5 marks)
- e) Describe the chromosomal aberration known as trisomy. (5 marks)

QUESTION 2

Write short notes on the following:

- a) Chemical bonds that hold the DNA molecule together. (5 marks)
- b) Codominance. (5 marks)
- c) Dihybrid cross. (5 marks)
- d) Multiple allelism. (5 marks)
- e) Chromosome inversion. (5 marks)

QUESTION 3

- a) If rabbits of genotypes $c^{ch}c$ and c^hc are mated ($c^{ch}c \times c^hc$), what are the genotypic and phenotypic ratios in the offspring? (5 marks)
- b) Which are the unique attributes that make DNA a hereditary molecule? (5 marks)
- c) The adenine content of a certain DNA species is 15%. What is the cytosine content of that DNA species? (5 marks)
- d) Write short notes on chromosome deletions. (10 marks)

QUESTION 4

- a) Explain with one example how incomplete dominance modifies Mendelian F₂ phenotypic ratio. (5 marks)
- b) Give five (5) major differences between DNA and RNA. (5 marks)
- c) Explain the following terms:
- i) Genetic code is degenerate. (5 marks)
 - ii) Dosage compensation. (5 marks)
- d) What is meant by "Antiparallel nature of DNA strands?" (5 marks)

QUESTION 5

Describe the following:

- a) Nucleotides. (5 marks)
- b) Monosomy. (5 marks)
- c) Point mutations. (5 marks)
- d) Codon. (5 marks)
- e) Genotype. (5 marks)

QUESTION 6

- a) State Mendel's law of independent assortment. (5 marks)
- b) Illustrate with one example the use of sex linkage in the sexing of day-old chicks. (5 marks)
- c) Describe the mechanism of inheritance of an X-linked recessive trait in humans. (15 marks).