



**GREAT ZIMBABWE UNIVERSITY**  
**ROBERT MUGABE SCHOOL OF HERITAGE AND EDUCATION**  
**DEPARTMENT OF SCIENCE AND TECHNICAL EDUCATION**



**B.ED (SECONDARY) IN SERVICE HONOURS DEGREE AGRICULTURE**

<b>PART 1</b>	<b>SEMESTER 2</b>
<b>MODULE CODE</b>	<b>TSAG 123/ TPAG 123-1</b>
<b>MODULE NARRATION</b>	<b>ANIMAL BREEDING AND GENETICS</b>

**B.ED (PRIMARY) IN-SERVICE HONOURS DEGREE AGRICULTURE**

<b>PART 1</b>	<b>SEMESTER 2</b>
<b>MODULE CODE</b>	<b>TPAG 123-1</b>
<b>MODULE NARRATION</b>	<b>ANIMALBREEDING AND GENETICS</b>
<b>YEAR</b>	<b>JUNE 2024</b>
<b>TIME</b>	<b>3 HOURS</b>

**INSTRUCTIONS TO CANDIDATES**

- Answer **three** questions only.
- At least **one** question from each section
- All questions carry equal marks

1. a) Fur colour in the rabbit, a furry little animal and popular pet, is determined by a pair of alleles, B and b, BB and Bb rabbits are black and bb are white. A farmer wants to breed rabbits for sale. True-breeding white (bb) female rabbits breed poorly. The farmer purchases a pair of black rabbits, and these mate and produced 6black and 2 white offspring. The farmer immediately sells his white rabbits, and then he comes to consult you for a breeding strategy to produce more white rabbits.

i) If he performed random crosses between pairs of F1 black rabbits, what proportion of the F2 progeny would be white? (3)

ii) If he crossed an F1 male to the parental female, what is the probability that this cross would produce white progeny? (3)

iii) What would be the farmer's best strategy to maximize the production of white rabbits? (4)

b) i) Giving examples, explain the main differences between complete dominance and partial dominance. (10)

ii) Describe mechanisms responsible for determining sex in animals. (5)

2a). A sex-linked gene in dogs and humans causes the bleeding hemophilia A.

i) If a hemophiliac male mates with a homozygous non-hemophilic female what proportion of their offspring will be hemophiliac? (3)

ii) If a daughter produced by the mating in (i) above mates with a normal male, what proportion of their offspring will be hemophiliac? (2)

b) In the guinea pig (*cavia*) there two alleles for hair colour, black and white and two alleles for hair length, short and long. In breeding experiment all the F1 phenotypes produced from a cross between pure-breeding short-black haired and pure- breeding long white haired parents had short-black hair. Explain:

i) Which alleles are dominant? (2)

ii) The expected proportions of F2 phenotypes (7)

3. a) Compare and contrast the structure and function of the following nucleic acids:

i) DNA and

ii) RNA (10)

b) Examine each of the following three stages involved in protein synthesis:

- Transcription (5)
- Amino acid activation (5)
- Translation (5)

**SECTION B: ANIMAL BREEDING**

4. a) Define animal breeding (2)

b) Explain the following **two** causes of inbreeding:

- Inbreeding due to genetic drift (2)
- Inbreeding due to non-random mating (2)

c) Asses the assertion that genetic diversity is important in animal breeding.  
(4)

d) Examine the traits of economic importance in cattle milk and meat production.  
(15)

5. a) Describe and explain the advantages of inbreeding (10)

b) Explain any three crossbreeding schemes (10)

c) Animals have been genetically modified since they were first domesticated. In recent years genetic modification has been happening more quickly as new techniques have been developed. Describe the techniques that can be used to manipulate the genetics of animals.

(5)

END OF EXAMINATION