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UNIVERSITY OF NAMIBIA

FACULTY	HEALTH SCIENCES & VETERINARY MEDICINE		
DEPARTMENT	PRECLINICAL STUDIES		
SUBJECT	VETERINARY GENETICS		
SUBJECT CODE	V3621EG		
DATE	JUNE 2025		
DURATION	2 HOURS	Marks	100

FIRST OPPORTUNITY EXAMINATION

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Internal Moderator: Prof. S. Chitanga
External Moderator: Prof. D. Pfukenyi

This question paper consists of 3 pages Including this front page.

Instructions

This question paper consists of five (5) questions.
Attempt all of them. Calculators may be used.

UNIVERSITY OF NAMIBIA EXAMINATIONS

QUESTION 1 **[20]**

Define the following pairs of terms and distinguish between them:

a) Homozygote/heterozygote (5 marks)

b) Codominance/overdominance (5 marks)

c) Transverse/transition mutations (5 marks)

d) Qualitative/quantitative traits (5 marks)

QUESTION 2 **[20]**

Labrador retrievers may be black, brown or yellow in colour. Although each colour may breed true, many different outcomes occur if numerous litters are examined from a variety of matings, where the parents are not necessarily true-breeding. The following results show some of the possibilities. Propose the most likely parental genotypes in each case consistent with the observed phenotypic ratios among the offspring.

a) Black x Brown ----------> all Black (5 marks)

b) Black x Yellow ----------> all Black (5 marks)

c) Black x Yellow ----------> 4/8 Yellow, 3/8 Black, 1/8 Brown (5 marks)

d) Brown x Brown ----------> 3/4 Brown, ¼ Yellow (5 marks)

QUESTION 3 **[20]**

a) Define freemartins. (2 marks)

b) How do freemartins arise? (4 marks)

c) Explain the effects of freemartin condition in female and male cattle? (8 marks)

d) What are the practical implications of the freemartin condition in cattle? (2 marks)

e) Distinguish between mosaics and chimeras. (4 marks)

QUESTION 4 **[20]**

(a) Explain the two key benefits of crossbreeding. (5 marks)

(b) Using examples, explain the advantages and disadvantages of the following commercial beef cattle breeding systems:

(i) Commercial straight breeding (5 marks)

(ii) Terminal crossing (5 marks)

(iii) Composites (5 marks)

QUESTION 5 **[20]**

a) Explain the meaning of peri-parturient rise (PPR) in fecal egg count. (3 marks)

b) What are the likely causes of PPR? (3 marks)

c) Discuss the importance of host (sheep) and helminth co-evolution over millions of years. (4 marks)

d) Using an example, explain how host genetic variation can be exploited in disease control. (5 marks)

e) Explain disease resistance and the ways in which it manifests in domestic animals. (5 marks)

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(i) Commercial straight breeding (5 marks)

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QUESTION 5 **[20]**

a) Briefly explain what causes rejection of organ and tissue plants and skin grafts. (4 marks)

b) Briefly explain the role of the major histocompatibility complex (MHC) in the body's response to disease. (4 marks)

c) The MHC is highly polymorphic. Explain what this means and its significance. (5 marks)

d) Explain why crossing over in the MHC loci is not common and the implication. (5 marks)

e) Give an example in livestock, of a known association that exists between MHC antigens and resistance or susceptibility to disease. (2 marks)