

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**FIRST YEAR EXAMINATION FOR THE AWARD OF CERTIFICATE IN ANIMAL
HEALTH AND PRODUCTION**

ANSC 00141: BASIC ANIMAL BREEDING AND GENETICS

STREAMS: CERT. ANHP (Y1S2)

TIME: 2 HOURS

DAY/DATE: TUESDAY 11/04/2023

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS:

- Answer ALL questions in section A and TWO questions in section B
- Do not write on the question paper
- Use illustrations where necessary

SECTION A (40 MARKS)

QUESTION ONE

Choose the most appropriate answer from the options given below

[10 marks]

(i) Full sib individuals are those having.....

- (a) Common sire and different dams
- (b) Both dam and sire are common
- (c) Both sire and dam are different
- (d) None of the above

(ii) A new breed can be developed by

- (a) Grading up
- (b) Outbreeding
- (c) Inbreeding
- (d) Crossbreeding

- (iii) When performance records of dams are used to estimate individuals true breeding values for selection purposes, the method is called
- (a) Family selection
 - (b) Pedigree selection
 - (c) Progeny selection
 - (d) Mass selection
- (iv) Reproductive cell division occurs through.....
- (a) Mitosis
 - (b) Meiosis
 - (c) Crossing over
 - (d) Interphase
- (v) Crossing over occurs between
- (a) Sister chromatids
 - (b) Non homologous sister chromatids
 - (c) Two chromosomes
 - (d) Homologous sister chromatids
- (vi) The term 'factor' was first coined by.....
- (a) Charles Darwin
 - (b) William Bateson
 - (c) Gregor Mendel
 - (d) Thomas Morgan
- (vii) Heritability in narrow sense is.....
- (a) V_A/V_P
 - (b) V_E/V_P
 - (c) V_G/V_P
 - (d) V_A+V_G/V_P
- (viii) The trait showing continuous variation due to additive effects of genes is.....
- (a) Poly gene
 - (b) Quantitative trait
 - (c) Qualitative trait
 - (d) Mendelian trait

- (ix) The nitrogenous base present in DNA but no in RNA molecule is.....
- (a) Adenine
 - (b) Cytosine
 - (c) Thymine
 - (d) Guanine
- (x) The process of protein synthesis from mRNA is called.....
- (a) Transcription
 - (b) Translocation
 - (c) Translation
 - (d) Transformation

QUESTION TWO

State if the following statements are true or false. If false, rewrite the statement after making necessary corrections. [5 marks]

- (i) The classical Medelian traits are quantitative in nature
- (ii) Outcrossing is mating between individuals of two breeds
- (iii) Reproductive traits are medium heritable traits
- (iv) Double structure of DNA molecule was given by Thomas Morgan
- (v) Meiosis is also termed as “Reduction division”.

QUESTION THREE

Filling the blanks [5 marks]

- (a) Phenotypic variation include.....and
- (b) Interphase of the cell cycle consists of.....,and
- (c) The chart of images of chromosomes is called.....
- (d) Universally accepted Mendel’s law is.....
- (e) Traits are controlled by.....

QUESTION FOUR

Give one word to the following

[5 marks]

- (i) A progeny produced by crossbreeding a horse and a donkey is called
- (ii) Shortest phase in mitosis is
- (iii) Selection on basis of performance of ancestors is called
- (iv) The word survival for the fittest was coined by
- (v) Organelle of protein synthesis in the cytoplasm of eukaryotic cell

QUESTION FIVE

Differentiate the following as used in animal breeding

[5 marks]

- (i) Mitosis & Meiosis
- (ii) Qualitative and quantitative genetics
- (iii) DNA and RNA
- (iv) Homozygous and heterozygous
- (v) Inbreeding and crossbreeding

QUESTION SIX

Match the pairs

[5 marks]

1) Column A	Column B
2) Value observed when the character is measured on individual	a) Allele
3) The value of individual judged by the mean of its progeny	b) Pleiotropic
4) Alternative form of a normal gene	c) Breeding value
5) Genes that influence more than one phenotype trait	d) Fitness
6) The contribution of offspring to the next generation	e) Phenotypic value

QUESTION SEVEN

Define the following terminologies as used in animal breeding and genetics

[5 marks]

- (i) Chromosomes
- (ii) Genotype
- (iii) Hybrid
- (iv) Cytogenetic
- (v) Breed

SECTION B (30 MARKS)

QUESTION EIGHT

- (a) What is Gene Frequency? What are the factors affecting gene frequency [5 marks]
- (b) In MN blood group system, genotypes are MM = 153, MN = 260, NN = 87. Calculate the gene frequencies of M and N alleles and genotypic frequencies. [5 marks]
- (c) Determine whether this population is in Hardy-Weinberg equilibrium given that the frequency for blood type p(M) = 0.4 and q(N) = 0/6 [5 marks]

QUESTION NINE

- (a) Enumerate artificial insemination (AI) as a reproductive technology [5 marks]
- (b) Briefly describe process of protein synthesis [5 marks]
- (c) Briefly describe different methods of animal selection [5 marks]

QUESTION TEN

- (a) Determine the appearance of (a) F1 and F2 progenies when a pure (homozygous) polled cow is crossed with a pure (homozygous) horned cow. Give the genotypic and phenotypic ratios. [5 marks]
 - (b) Describe briefly the stages of mitosis cell division process chronologically. [10 marks]
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