



KAPASA MAKASA UNIVERSITY
FACULTY OF APPLIED SCIENCE AND OPEN LEARNING
DEPARTMENT OF AGRICULTURE AND AQUATIC SCIENCES
CHINSALI, MUCHINGA PROVINCE
GENETICS – AS 211
END OF YEAR FINAL SESSIONAL EXAMINATION

29TH OCTOBER 2024

INSTRUCTIONS TO CANDIDATES

1. Time allowed is **THREE (3) HOURS**
2. Remember to write your student identity number (SIN) on the provided answer sheets
3. All questions carry equal marks (**20 Marks**)
4. Question one is **COMPULSORY**
5. Attempt a total of **FIVE** questions

CELLPHONES AND OTHER RELATED GAGETS ARE NOT ALLOWED IN THE EXAMINATION ROOM

DO NOT TURN THIS PAGE UNTIL YOU HAVE BEEN TOLD TO DO SO BY THE CHIEF INVIGILATOR

QUESTION ONE

1. The following variances were calculated for two traits in a herd of hogs.

Trait	VP	VG	VA
Back fat	30.6	12.2	8.44
Body length	52.4	26.4	11.70

- A. Calculate broad-sense (H^2) and narrow-sense (h^2) heritability for each trait in this herd. **(8 marks)**
- B. Which of the two traits will respond best to selection by a breeder? State why? **(2 Marks)**
- C. The exchange of precisely homologous segments between non-sister chromatids of homologous chromosomes are vital for breeding. State three factors that affects this process and briefly explain on any of the two factors. **(5 marks)**
- D. Define gene action and briefly explain the gene action based on pleiotropy **(5 marks)**

QUESTION TWO

2. Write short notes on the following;

- A. Hardy-Weinberg equilibrium and the factors necessary for the maintenance of equilibrium in any given population **(5 marks)**
- B. Artificial selection **(5 marks)**
- C. Significance of mitosis **(5 marks)**
- D. Gene action based on incomplete dominance **(5 marks)**

QUESTION THREE

3.

- A. State three reasons that led to Mendel's success in his work and briefly explain any of the two. **(5 marks)**
- B. Explain the meaning of the statement, "The phenotype of an organism does not always reflect its genotype." **(5 marks)**
- C. Explain briefly how you can determine whether an organism with a dominant phenotype is homozygous dominant or heterozygous dominant **(6 marks)**
- D. Explain the practical importance of the Mendel's law of dominance **(4 marks)**

QUESTION FOUR

4.

- A. Briefly but concisely explain what Cytoplasmic Male Sterility in maize is and its practical importance in breeding. (5 marks)
- B. State three common assumptions of quantitative genetic analysis that a researcher makes as he/she plans to undertake a breeding program (5 marks)
- C. In Caucasians, the *M*-shaped hairline that recedes with age (sometimes to nearly complete baldness) is due to an allele that is dominant in males but recessive in females. The frequency of the baldness allele is approximately 0.3. Assuming random mating, what frequencies of the bald and non-bald phenotypes are expected in males and females? (5 marks)
- D. State three types of chromosomes and explain any two. (5 marks)

QUESTION FIVE

5.

- A. Explain the basic differences between mitotic and meiotic cell division (5 marks)
- B. State three ways in which linkage can be classified and explain briefly but concisely the classification based on crossing over (5 marks)
- C. State five differences between prokaryotic and eukaryotic cells (5 marks)
- D. State five characteristics of mutation (5 marks)

QUESTION SIX

6.

- A. Mendel summarized his conclusions about heredity by describing the gametes produced by the F1 generation in the following manner: "Pea hybrids form germinal and pollen cells that in their composition correspond in equal numbers to all the constant forms resulting from the combination of traits united through fertilization." Explain this statement in terms of the principles of segregation and independent assortment. (10 marks)
- B. A genetically heterogeneous population of wheat has a variance in the number of days to maturation of 46 whereas two inbred populations derived from it have a variance in the number of days to maturation of 8.

- I. What is the genotypic variance, (V_G), the environmental variance, (V_E), and the broad-sense heritability, (H^2), of days to maturation in this population? **(6 marks)**
- II. If the inbred lines were crossed, what would be the predicted variance in days to maturation of the F1 generation? **(4 marks)**

QUESTION SEVEN

7. The breeder informs you that there are not sufficient genetic variations in the germplasm available to work with to advance desirable traits in an elite line. Explain briefly but concisely how you can help the breeder working with the same germplasm but achieve the objective of introgression of desirable traits in the elite line. **(20 marks)**

END OF THE EXAMINATION. ALL THE BEST.



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DEPARTMENT OF AGRICULTURE AND AQUATIC SCIENCES
CHINSALI, MUCHINGA PROVINCE
PRINCIPLES OF CROP SCIENCE - AS 220
END OF YEAR FINAL SESSIONAL EXAMINATION

15TH OCTOBER 2024

INSTRUCTIONS TO CANDIDATES

1. Time allowed is **THREE (3) HOURS**
2. Remember to write your student identity number (SIN) on the provided answer sheets
3. All questions carry equal marks (**20 Marks**)
4. Question one is **COMPULSORY**
5. Attempt a total of **FIVE** questions

CELLPHONES AND OTHER RELATED GAGETS ARE NOT ALLOWED IN THE EXAMINATION ROOM

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QUESTION ONE

1. A farmer in Chinsali district planted maize following the spacing of 75cm X 30cm.
- A. Calculate the number of maize plants in the area of 50m X 50m. **(10 marks)**
 - B. Estimate the amount of fertilizer to be applied per plant if the farmer bought 4 X 50kg bags of fertilizer. **(10 marks)**

QUESTION TWO

2. A small-scale farmer comes to you for consultation on the legume crop to grow this farming season of 2023/2024.
- A. What crops can you recommend? **(6 marks)**
 - B. What products can be produced from these legume crops? **(5 marks)**
 - C. What benefits do these legume crops give to the soil? **(5 marks)**
 - D. With examples mention some legume crops that can benefit the soil. **(4 Marks)**

QUESTION THREE

- 3.
- A. Explain the process of respiration in plants. **(15 marks)**
 - B. List factors that affect the rate of respiration **(5 Marks)**

QUESTION FOUR

4. Discuss the factors that favour distribution of crops across the globe that result in crops located in one place but fails to grow in another place. **(20 marks)**

QUESTION FIVE

- 5.
- A. Define the enzymes in plants. **(10 marks)**
 - B. What factors affect the work of enzymes **(10 marks)**

QUESTION FIVE

- 6.
- A. Mention environmental stresses that affect plants. **(12 Marks)**
 - B. How do plants adapt to environmental tresses? **(8 Marks)**

QUESTION SEVEN

7.

- A. What are weeds in agriculture production? (6 marks)**
- B. How are weeds classified? (8 marks)**
- C. Give reasons for controlling weeds in the field where crops grow. (6 marks)**

END OF EXAMINATION, BEST WISHES.



KAPASA MAKASA UNIVERSITY
CHINSALI, MUCHINGA PROVINCE
ANIMAL ANATOMY AND PHYSIOLOGY – AS 200
END OF YEAR FINAL SESSIONAL EXAMINATION

OCTOBER 2024

INSTRUCTIONS TO CANDIDATES

1. Time allowed is **THREE (3) HOURS**
2. Remember to write your identity number on the provided answer sheets
3. All questions carry equal marks (**20 Marks**)
4. Question one is **COMPULSORY**
5. Attempt a total of **FIVE** questions

CELLPHONES & PROGRAMMABLE CALCULATORS ARE NOT ALLOWED IN THE EXAMINATION ROOM

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QUESTION ONE

1. Knowledge of anatomy and physiology will always be an important integral component of your future career as an Animal Scientist. While attempting **ANY FOUR** of the following, kindly:
- A. State the different classes of the bones of a heifer **(5 Marks)**
 - B. Mention the organs that comprise the endocrine system **(5 Marks)**
 - C. Describe a broiler's stomach **(5 Marks)**
 - D. State the most palpable lymph nodes in an ox **(5 Marks)**
 - E. Demonstrate the major signs of estrus in a heifer **(5 Marks)**
 - F. Describe the anatomy of the ox trachea and lungs **(5 Marks)**

QUESTION TWO

2. The future growth and improved livestock population in Zambia is partially based on full exploitation of the advances in Theriogenology and its application. While other countries are exploiting this avenue, Zambia is relatively passive in its approach especially with set target to feed the region. Therefore, there is need to manipulate this aspect whose basic understanding of the reproductive system and physiology is a must. When all is said and done, my dear colleague, state the major hormones that affect reproduction **(20 Marks)**

QUESTION THREE

3. With the aid of a sketch, describe foetal circulation in detail **(20 marks)**

QUESTION FOUR

4. In detail, describe the anatomy of the stomach in the ox **(20 marks)**

QUESTION FIVE

5. With the aid of a sketch, describe the anatomy of the skin **(20 marks)**

QUESTION SIX

6. Compare and contrast the carcass characteristics of a heifer and bullock **(20 marks)**

QUESTION SEVEN

7. Successful calving is vital to ensure profitability of the beef herd. Given your vast knowledge of

Animal physiology, precisely and concisely attempt and state:

- A. The process of maternal recognition of pregnancy in a cow **(10 marks)**
- B. The hormones involved in the maintenance of pregnancy **(5 marks)**
- C. The methods of pregnancy diagnosis in cattle **(5 marks)**