
**UNIVERSITY OF FORT HARE
FACULTY OF SCIENCE AND AGRICULTURE**

**INTRODUCTION TO CROP SCIENCE
AGC122**

SUPPLEMENTARY EXAM

FEBRUARY 2019

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Time: 3 HOURS
Subject: AGC122
Marks: 100 MARKS

This paper consists of TWO pages including the cover page

Examiner(s)
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INSTRUCTIONS

- 1. There are FOUR questions, answer ALL.**
- 2. Write all answers in the answer book.**
- 3. Number all answers correctly.**

QUESTION 1 [20 marks]

- 1.1 Name four (4) physical qualities of seeds with high germination quality. [4]
- 1.2 Mention four (4) types of internal seed dormancy and discuss how dormancy arises as a result of each type of internal dormancy [16]

QUESTION 2 [9 marks]

- 2.1 Name three meristematic tissues according to their positions, and discuss where on the plant they are found. [9]

QUESTION 3 [11 marks]

- 3.1 Discuss 4 ways in which bisexual flowers can prevent self-pollination. [11]

QUESTION 4 [10 marks]

- 4.1 Name five (5) of the six (6) important steps involved in seed formation. [10]

QUESTION 5 [20 marks]

5.1 A woman went to give birth in St Dominics Hospital. After successful delivery, her baby had to be taken to intensive care unit to deal with an intestinal infection. When two babies were returned, nurses were not sure which baby belonged to her. Blood groupings of the ABO and MN systems were used to decide which of the two babies belonged to her. The facts were as follows:

	<u>ABO System</u>	<u>MN System</u>
Mother	AO	N
Father	B0	MN
Baby A	O	M
Baby B	AB	N

- i) Based on the ABO system, which of the two babies belonged to her? Show your working and provide a reason(s) for your answer. [4]
- ii) Based on the MN system, which of the two babies belonged to her? Show your working and provide a reason(s) for your answer. [3]

iii) When the ABO and MN systems are considered together, which baby belongs to the mother in question? [2]

5.2 Give brief definitions of the following terms; [3]

- i) Lethal genes
- ii) pleiotropism
- iii) Over-dominance

5.3 The ability to taste the chemical phenylthiocarbamide is an autosomal dominant phenotype (T). The inability to taste this chemical is recessive (t). A heterozygous taster woman marries a heterozygous taster man. What is the probability that their children will be: (show your working) [4]

- (i) A nontaster
- (ii) A taster.

5.4 What is the genotypic ratio that can be expected from the cross described in “5.3”? [2]

5.5 Why is fertilisation in plants described as “double fertilization”? [2]

QUESTION 6 [20 marks]

6.1 With the aid of a well-labeled diagram, illustrate how the process of megasporogenesis occurs in flowering plants. [12]

6.2 A normal woman whose father was an albino marries a man who is a carrier for the condition. What is the probability that the couple will have; (i) An albino; (ii) A carrier; (ii) A normal child who is a non-carrier? [4]

6.3 The recessive allele *g* causes drosophila to have blue eyes, and the dominant allele *G* causes development of red eyes. This gene is known to be sex linked. If a blue-eyed male is crossed with a heterozygous type female;

i) What ratio of red-eyed to blue-eyed flies can be expected in the F1? [4]

QUESTION 7 [10 marks]

7.1 Rolling up the edges of a tongue is dominant (R) to inability to roll up the edges of a tongue, which is recessive (r). Two heterozygous tongue-rollers get married to each other. What are the genotypic and phenotypic ratios that will be expected from this marriage? [4]

7.2 . An X-linked recessive gene causes haemophilia in humans. A normal woman whose father had haemophilia marries a man who is haemophiliac.

i) What genotypes are possible for the mother of the haemophiliac man? [2]

ii) What are the chances of obtaining the following types of children from this marriage: (Show your working). [3]

a) A haemophiliac child?

b) A child who is a carrier?

iii) What percentage of girls from this marriage are expected to be haemophiliac? [1]