



FIJI NATIONAL UNIVERSITY
College of Agriculture, Fisheries & Forestry
School of Agriculture & Forestry
Department of Crop Science
Bachelor of Science in Agriculture – Year III
Trimester II – Final Examination – 2019

GPB 704: BREEDING OF FIELD CROPS

Time Allowed: 3.00 hours (excluding reading time) Total Marks: 100

INSTRUCTIONS:

1. This paper consists of **four** pages.
2. Please check to see that all your paper is complete.
3. Answer all the Objective Type and Descriptive Type Questions in the Answer Booklet only.
4. Please write on the Answer Booklet according to the order of the questions.
5. **NO** written or printed material and mobile phones are allowed in the examination hall.
6. Marks allocated for each question appears at the side of each question so allocate your time accordingly.
7. This paper is divided into **Two (2)** parts. First part contains Objective Type Questions, which is having **two (2)** Sections – A and B. Second part is Descriptive Type Questions, which is having **eight (8)** questions that you only need to **pick six (6)** to answer.

I. OBJECTIVE TYPE QUESTIONS (40 Marks)

Section A: Multiple choice questions. (10 Marks)

Section B: Short answers. (30 Marks)

II. DESCRIPTIVE TYPE QUESTIONS (60 marks)

There are **eight (8)** descriptive type questions, which you only need to pick **six (6)** to answer. Please provide precise answers. Please write on the Answer Booklet according to the order of the questions. Answer every question from a new page to facilitate evaluation.

Student ID No.:

Date.....

I. OBJECTIVE TYPE QUESTIONS

Note: Answer on the answer booklet.

Total Marks: 40

A. Multiple choice questions: please select the correct answer.

(10x1=10 Marks)

1. Which of the following **BEST** describe that a new variety is developed by selection of single best plant progeny among traditional varieties or landraces?
 - a. Bulk method
 - b. Mass selection
 - c. Pure line selection
 - d. Pedigree method
2. Which of the following **BEST** describe the progeny of mass selection?
 - a. The descendent only comes from self-pollinated parents
 - b. The best types from a segregating population
 - c. The single best plant progeny
 - d. The superior type out-perform either one parent of both parents
3. All the pulses have typical papilionaceous flower, where stamens are fused as which of the following diadelphous conditions?
 - a. 8+1
 - b. 9+1
 - c. 10+1
 - d. 12+1
4. Which of following is **NOT** a basic form of plant distribution?
 - a. Clumped
 - b. Random
 - c. Uniform
 - d. Irregular
5. In breeding, source of resistance can **NOT** be obtained from which of the following?
 - a. An unknown variety
 - b. Germplasm collection
 - c. Related species
 - d. Through mutations
6. Concepts of modern plant breeding does **NOT** include which of the following?
 - a. Pure line breeding
 - b. Maker-assisted selection
 - c. Mutation breeding
 - d. Reverse breeding
7. In genetic male sterility, which of the following would be the B line or maintainer line?
 - a. Ms Ms
 - b. mS mS
 - c. ms ms
 - d. Ms ms

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8. The loss of genetic diversity in a species, can also be called as which of the following?
 - a. Genetic decline
 - b. Genetic emission
 - c. Genetic erosion
 - d. Genetic deterioration
 9. Which of the following refers to male sterility caused by mutation of mitochondrial gene, or some other cytoplasmic factors outside the nuclear genome?
 - a. Cytoplasmic-Genetic Male Sterility (CGMS)
 - b. Cytoplasmic Male Sterility (CMS)
 - c. Genetic Male Sterility (GMS)
 - d. Mitochondrial-Cytoplasmic Male Sterility (MCMS)
 10. Which of the following is the **CORRECT** description of the option values of genetic resources?
 - a. Options in which genes can either be used for plant or animal breeding
 - b. Options given to any direct or indirect use in the future
 - c. Options in which information held in conserved resources
 - d. Options given for passing resources on to future generations

B. Short answers.

(10x3=30 Marks)

11. Variation exists in variety developed by mass selection. What are the things that you need to do after the selection procedure?
12. Conserved genetic resources may also have economic value. What would be one example if the resources are not currently being used?
13. How do you describe the grain seeds from alfalfa, clover, peas, beans and lentils?
14. How do you describe the process of replacing the normal sexual reproduction by asexual reproduction, without fertilization?
15. How does peanut selection usually be done?
16. How do you describe the exchange of genetic material between two populations?
17. How do you describe the tendency of a crossbred individual to show qualities superior to those of both parents?
18. How many different types of genomes are derived from the 35 diploid cotton species?
19. What would be the constant inputs of which required in the continuing process of enhancement through selective breeding?
20. How do you describe the transfer of one or more characters into a single variety from other varieties?

II. DESCRIPTIVE TYPE QUESTIONS

(60 Marks)

Note: Please provide precise answers. Pick 6 question to answer. Each question is ten marks.

1. You have sampled a population in which you know that the percentage of the homozygous recessive genotype (rr) is 24%. Using this 24%, **please provide the formula and calculate the following (please use two decimal points for your calculation):** 10
 - a) The frequency of the “r” allele.
 - b) The frequency of the “R” allele.
 - c) The frequencies of the genotypes “RR” and “Rr.”
2. Please **provide** the differences between traditional and ideotype breeding. 10
3. Please **provide** and elaborate the major considerations of breeding heterosis in crops. 10
4. Please **provide** and explain the features of rice ideotype. 10
5. Please **provide** and explain the laws of Mendelian Genetics. 10
6. Please **provide** the physiological features (changes) when plants are under drought stress. 10
7. Please **provide** and explain the emasculation technique. 10
8. Please **provide** and explain the breeding methods for insect resistance. 10

The End

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