Student ID No.:..... Date: .....

FIJI NATIONAL UNIVERSITY

College of Agriculture, Fisheries & Forestry

Bachelor of Science in Agriculture, Trimester II Final Examination - 2017

GPB 704: Breeding of Field Crops

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

INSTRUCTIONS:

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

I. OBJECTIVE TYPE QUESTIONS (4O Marks)

To be answered only on the Answer Sheet.

Section A: Fill in the blanks.	(10 Marks)
Section B: Multiple choice Questions.	(10 Marks)
Section C: Write True or False.	(10 Marks)
Section D: Match the following.	(10 Marks)

II. DESCRIPTIVE TYPE QUESTIONS (60 marks)

There are **six (6)** descriptive type questions, please provided short and 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 only on the Answer Sheet.

Time: 60 Minutes **Total Marks: 40**

A. Fill in the blanks. (10x1=10 Marks)

1. _____ is the art and science of changing the traits of plants in order to produce desired characteristics.
2. The first requirement of any breeding program is to produce _____ in the characters (or traits) in which we are interested.
3. _____ can be defined as any genetic material of plant origin of actual or potential value for food and agriculture.
4. _____ refers to an interspecific hybrid having a complete diploid chromosome set from each parent form.
5. _____ refers to the tendency of a crossbred individual to show qualities superior to those of both parents.
6. Pulse hybrid seeds are produced based on _____ crossing scheme.
7. _____ defines that some alleles are dominant while others are recessive.
8. _____ is the exchange of genetic material between two populations.
9. _____ refers to model plants for a specific environment.
10. _____ are a group of highly variable small-seeded grasses, such as *Eleusine coracana* and *Panicum miliaceum*.

B. Multiple choice questions: Select the correct answer. (10x1=10 Marks)

11. Which of the following refers to the replacement of the normal sexual reproduction by asexual reproduction, without fertilization?
    a. Polyploidy.
    b. Self-incompatibility.
    c. Apomixis.
    d. Selfing.
12. Which of the following does NOT belong to the features of rice ideotype?
    a. Semi dwarf stature.
    b. High pillaring capacity.
    c. Short, erect, thick and highly angled leaves.
    d. More panicles per square meter.
13. Which of the following is NOT the factors affecting development of ideal plant type?
    a. Socio-economic condition of farmers.
    b. Single use purpose.
    c. Cultivation.
    d. Crop Species.

14. Which of the plant feature promotes resistance to biotic stress?
    a. Hairy type.
    b. Waxy coating.
    c. Small stomata size.
    d. All of above.
15. 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.
16. Mechanisms of drought resistance does NOT include which of the following?
    a. Drought accumulation.
    b. Dehydration avoidance.
    c. Dehydration tolerance.
    d. Sum total of drought avoidance and tolerance.
17. Selection for salt tolerant genotype can be done in which of the following method?
    a. Germination (%) is saline medium.
    b. Leaf injury and ion content.
    c. Osmoregulation.
    d. All of above.
18. Values of genetic resources for food and agriculture does NOT include:
    a. Option value.
    b. Bequest value.
    c. Direct economic value.
    d. Existence value.
19. Which of the following is NOT the major concern when breeding heterosis in self-pollinated crops?
    a. The gain of heterotic effect.
    b. The frequency of occurrence of heterosisin crops.
    c. Possibility of obtaining economically viable heterosis.
    d. Yield and cost balance.
20. Which of the following is a common peanut breeding method?
    a. Selection.
    b. Pedigree method.
    c. Mutation breeding.
    d. All of above.

C. Check 'True' or 'False'. (10x1=10 Marks)

	Statement
21.	The loss of wild relatives occurs mainly through genetic engineering.
22.	Intra-specific hybridization hybridization transfers some genes from one species into the genome of the other species.
23.	Inter-specific hybridization is the crosses are made between two different species of the same genus.
24.	A typical pulse flower consisting of ten stamens, nine fused to farm staminal column and one free stamen is called monoadelphous conditions.
25.	Genetic drift is the process by which some organisms have a greater chance of surviving and reproducing than others due to features that are better adapted to the environment.
26.	Horizontal resistance is generally controlled by polygenes.
27.	Peripatric speciation occurs when one portion of a population exploits a new opportunity that was previously unexploited and becomes sufficiently different as to be considered a new species.
28.	Agriculture and genetic resources are critically interdependent.
29.	*Oryza sativa* contains two major subspecies: 1) *O. japonica*, and 2) *O. indica*.
30.	Intercellular ice formation is more lethal may be due to physical disruption of subcellular structure by ice crystal.

D. Match the following (10x1=10 marks)

31.	To avoid self-pollination	A	Teosintes
32.	Law of segregation of genes	B	Resistance
33.	Cytoplasmic-Genetic Male Sterility (CGMS)	C	Gregor Mendel
34.	Maize evolution	D	Self-incompatibility
35.	Genetic Male Sterility	E	Allele and genotype frequencies
36.	Chilling sensitive plants	F	Restorer gene, R
37.	Desirable characteristics	G	Recessive nuclear gene
38.	Mass selection	H	No progeny test
39.	Mutation Breeding	I	Yield
40.	Hardy–Weinberg Principle	J	Tropical

II. Descriptive type Questions (60 Marks)

Note: Please provide short and precise answers. Each question is ten marks.

1.	Please compare the differences between traditional and ideotype breeding.	10
2.	Please describe the procedures for hybridization.	10
3.	Please elaborate the breeding objectives in Pulses.	10
4.	Please explain the laws of Mendelian Genetics.	10
5.	Please explain the genetic differences between teosinte and corn.	10
6.	You have sampled a population in which you know that the percentage of the homozygous recessive genotype (rr) is 49%. Using this 49%, calculate the following: a) The frequency of the "r" allele. b) The frequency of the "R" allele. c) The frequencies of the genotypes "RR" and "Rr."	10

The End

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