



FIJI NATIONAL UNIVERSITY
College of Agriculture, Fisheries & Forestry
School of Agricultural Sciences & Forestry
Department of Crop Production
Bachelor of Science in Agriculture– Year 3
Final Examination
Trimester 1 - 2019
GPB702- Principles of Plant Breeding

Writing Time: 3:00 hours

Reading Time: extra 10 minutes allowed at the beginning of the exam

Total Marks: 100

INSTRUCTIONS:

1. This paper consists of **three** pages.
2. Please check to see that all your paper is complete.
3. Answer all 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 section appears at the side of each question so allocate your time accordingly.
6. This paper is divided into three sections.

Section A: Objective questions

(10 Marks)

Section B: Short answer

(40 Marks)

Section C: Essay

(50 Marks)

Section A: Multiple Choice**(10 Marks)**

1. _____ is a specialized condensed shoot of an angiosperm plant.
a. Sepal b. Petal
c. Flower d. Fruit
2. The ovary gives rise to the _____ and the ovules give rise to _____.
a. Fruit & Seed b. Seed & Fruit
c. Flower & Seed d. Flower & Fruit
3. Cross Pollination can also be called as _____.
a. Geitonogamy b. Homogamy
c. Autogamy d. Allogamy
4. _____ is sum of a population's genetic material at a given time.
a. Gene pool b. Genetic stocks
c. Gene erosion d. Genetic vulnerability
5. One among the decision making statistics for plant breeders is _____.
a. ANOVA b. Bioinformatics
c. Molecular Markers d. None of the above
6. _____ is the first step of making the wild weed species to cultivated plants.
a. Plant Introduction b. Acclimatization
c. Hybridization d. Domestication
7. _____ are usually stronger than either of the parents.
a. Breeds b. Wild Variety
c. Hybrids d. Seeds
8. _____ is used as synonym of heterosis.
a. Hybrid vigor b. Hybrid
c. Hybrid viability d. None of the above
9. _____ is the ability of plants to endure extreme conditions.
a. Totipotency b. Plasticity
c. Morphogenesis d. Capability
10. _____ are stamen produce pollen in anther.
a. Megasporophylls b. Microsporophylls
c. Sporophylls d. Seeds

Section B: Short answer**(40 Marks)****Section B 1: Attempt any FIVE questions (5 x 3 = 15 Marks)****Analyze the below terms and provide information**

11. Flower a condensed shoot- Floral Biology.
12. Fission, Fragmentation and Spore formation.
13. Autogamy- three methods of autogamy.
14. Germplasm- importance of germplasm to plant breeding.
15. Genetic vulnerability and Genetic erosion.
16. Plant introduction and acclimatization.

Section B 2: Attempt any FIVE questions (5 x 5 = 25 Marks)**Apply the knowledge and generate answers for the following with diagrams:**

17. Importance and significance of plant breeding in agriculture industry.
18. Apomixis & vegetative reproduction.
19. Natural and Artificial selection methods for plant breeding.
20. Five major types of germplasm sources.
21. Heterosis and Hybrid Vigor, then types of heterosis.
22. In the plant species *Hibiscus*, most individuals have large flowers. However, plants that are homozygous recessive at the G allele have small flowers. If there are 75 plants with large flowers (G₋), and 25 plants with small flowers (gg), calculate the following (assume Hardy-Weinberg equilibrium):
 - a) The frequency of alleles G and g
 - b) The genotype frequencies or heterozygosity (H)

Section C: Essay**(50 Marks)****Attempt any FOUR questions (4 x 12.5 = 50 Marks)****Demonstrate with diagram and generate information on the following**

23. Development of micro and megaspores with diagram.
24. Pedigree, Bulk and Backcross methods for selection procedure with flowchart diagram.
25. Aim, objective, types and procedures of hybridization.
26. Mechanism of cross pollination and types based on pollinating agents.
27. A population of Image result for pepper (*Piper nigrum*) can be either black or white; the black allele (B) has complete dominance over the white allele (b). Given a population of 1,000 pepper 840 black and 160 white, calculate and determine the allele frequency, the frequency of individuals per genotype, and number of individuals per genotype.

THE END**XXXXXXXXXXXX**