AFRICA UNIVERSITY
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*"Investing in Africa's Future"*

# COLLEGE OF HEALTH, AGRICULTURE & NATURAL SCIENCES

## ACP305 PLANT BREEDING & BIOTECHNOLOGY
## END OF SEMESTER EXAMINATIONS

**NOVEMBER 2019**

**LECTURER: DR. CHITEKA**

**DURATION: 3 HOURS**

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***INSTRUCTIONS***

***Answer Any 5 Questions***

1 (a) The type of pollination for a crop determines the breeding strategy to be employed. Discuss this statement citing examples of crops in each category. [10]
(b) Discuss pure line selection as a breeding method and demonstrate why it is widely used for breeding of self-pollinated crops and give the limitations. [10]

2 The breeding procedure defines the type of cultivar that is produced from a breeding progam of a cross pollinated crop. Discus the genesis of following types of cultivars and giving their advantages and limitations. Use maize an example in your illustrations.

a) Single hybrid [5]
b) Three-way cross [5]
c) Inbred line [5]
d) Double hybrid [5]

3 (a) You are a breeder in your country and have joined a freshly set up tomato breeding program. Identify and discuss the principles that you would follow to develop tomato breeding objectives. [10]

(b)Identify a particular region that has a market for tomatoes, describe the characteristics of the region and develop a product profile for the tomato variety that you would develop for this area. [10]

4 You have joined a soyabean breeding program where they use the modified pedigree method for cultivar improvement. You have inherited F1 seed harvested for 20 crosses. Discuss the processes that you would follow until you have elite materials ready for inclusion in preliminary yield trials. [20]

5 (a) An outcrossing species has the genotype composition 30AA, 50Aa and 20aa. Determine whether this population is in Hardy-Weinberg equilibrium. [8]
(b) Discuss the conditions that are necessary for populations to achieve Hardy-Weinberg equilibrium. [12]

6 (a) Cross pollinated crops have evolved mechanisms associated with cross pollination. Discuss the reasons for such mechanisms in these species. [6]

b) Discuss the various mechanisms associated with cross pollination and how they contribute to the genetic state of populations of allogamous species. [14]

**END OF EXAMINATION PAPER**