THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME – LEVEL 05
FINAL EXAMINATION – 2010/2011
BOTANY
BTU 3111/BTE 5111 – PLANT BREEDING

DURATION : TWO and HALF (21/2) HOURS

DATE : 01.07.2011 TIME : 1.30 – 4.00 p.m.

ANSWER ANY FOUR (04) QUESTIONS

1.

a) The breeding methods applicable to a crop species depend on the mode of reproduction and floral morphology. Based on these characteristics, plant breeders develop different populations/varieties.

i) What are the four (04) fundamental types of populations that the plant breeders produce in different crops?

ii) Briefly describe the populations mentioned in part (i).

b)

i) What is meant by "Population Mean" with respect to a quantitative character?

ii) Briefly discuss the factors causing the differences in Population Means.

c)

i) What is the Variance associated with a quantitative trait?

ii) What are the genetic components of the variance?
Briefly discuss them.

2.

a) What is heritability of a trait?

b) Two homozygous varieties of wheat were crossed to produce F_1 hybrids. The average phenotypic variance in yield of the three populations P_1, P_2 and F_1, was 10.60. The variance of F_2 was 20.60.

i) Calculate the heritability of yield in the F_2 population.

c) In maize, the inbred lines, A, B, C, D and E were crossed in all possible combinations in a diallel cross. The progeny produced the following data for the yield. Select the line with the best General Combining Ability (GCA).

	A	**B**	**C**	**D**	**E**
A	31	33	40	30	32
B	42	40	42	35	34
C	40	40	40	36	38
D	30	42	36	35	30
E	30	35	32	28	21

d) What is the Average effect of a gene?

e) The wing length (*l*) of fruit fly is a quantitative trait. The wing length of three genotypes of fruit fly at 3 weeks of age are approximately as follows;

Find out the average effects of the genes. (Assume allele frequency (*q*) of *l* is 0.4)

	Genotypes		
	++	+*l*	*ll*
Wing length in mm	12	10	7

3. a) What are somatic hybrids ?

b) Describe in brief the steps involved in producing somatic hybrids.

c) Explain in brief the methods you use to confirm the true hybridity of putative somatic hybrids.

4.

a) What are asexually propagated plants? How are they classified?

b) Describe in brief the breeding methods applicable for asexually propagated plants.

c) What are plant mutations?

d) Briefly describe different types of plant mutations identified.

5.

a) What are Plant Genetic Resources?

b) Describe in brief the causes of genetic erosion.

c) What are the main steps involved in *ex situ* conservation of plant genetic resources? Briefly explain these steps.

6.

a) What are the different types of selection methods practiced for cross pollinated crops?

b) Describe two of the selection methods mentioned in section (a) giving the advantages and drawbacks of each method.