

THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME – LEVEL 05
FINAL EXAMINATION – 2009/2010
BOTANY
BTU 3111/BTE 5111 – PLANT BREEDING



DURATION : TWO and HALF (2 1/2) HOURS

DATE : 24.06.2010

TIME : 1.00 – 3.30 p.m.

ANSWER ANY FOUR (04) QUESTIONS

1.

- a) What are hybrid varieties ?
- b) What is Hybrid Vigour ?
- c) Explain briefly how hybrid vigour is utilized in a breeding programme.
- d)
 - i) Use a flow chart to explain the **Back cross** method of breeding.
 - ii) Describe the procedure/s you would follow to transfer
 - a) a dominant gene and
 - b) a recessive geneto the recurrent parent using back cross method.

2.

- a)
 - i) What is somoclonal variation ?
 - ii) What are the factors that affect somoclonal variation ?
- b) Explain how somaclonal variation can be utilized for crop improvement.
- c) What are the problems and advantages of applying somoclonal variation in crop improvement ?

3.

- a) What are asexually propagated plants ? How are they classified ?
- b) Describe in brief the breeding methods for asexually propagated plants.
- c) Explain the procedure of clonal selection in asexually propagated plants using a flow chart.
- d) Compare the advantages and drawbacks of the clonal selection procedure.

4.

A)

- i) Explain the following ;
 - a) Average effect (α)
 - b) Breeding value (A)
 - c) Dominance deviation (D)
- ii) Find out the breeding values and dominance deviations of the following genotypes.

(Assume allele frequency (q) of X_1 is 0.4)

GENOTYPE	X_1X_1	X_1X_2	X_2X_2
GENOTYPIC VALUE	110	150	90

- iii) Name the four (04) main factors which contribute to the change in gene frequencies of a population. Explain briefly how each factor causes change in gene frequency.

B)

- i) What is heritability ?
- ii) Two homozygous varieties of corn were crossed to produce F_1 hybrids. The average phenotypic variance in yield of three populations P_1 , P_2 and F_1 was 10.50. The variance of F_2 was 20.50.
- a) Calculate the heritability of yield in the F_2 population.
- b) Do you think that subsequent selection in future generations would be successful in further changing the yield in corn ?

5.

- A) The breeding methods applicable to a crop species depend on its mode of reproduction and flower morphology. According to these characteristics, plant breeders recognize four (04) fundamental populations.

- i) What are they ?
- ii) Briefly describe them.

B)

- i) What is population mean ?
- ii) Briefly discuss the factors causing the differences in Means.

C)

- i) What is the Variance ?
- ii) Briefly discuss the genetic components of variance.

- 6.
- a) Explain what embryo rescue is, and describe its use.
- b) What are haploid plants ?
- c) Describe in brief the techniques of microspore culture.