Uva-Wellassa University, Sri Lanka

1st semester Examination Dec/Jan 2010

SCT-312-2 - Breeding & Genetics

Time: Two (02) hours

Part B

Answer three (03) questions only

1.

a) What is a land race and why they are important?

(05 marks)

b) A farmer in a rural area is reported to own a traditional Bean (*Phaseolus vulgaris*) variety called '*Rani*' which produces large seeds. This land race is not subjected to any kind of selection. Describe the main steps in a suitable breeding method to isolate a large-seeded pure line of beans using variety '*Rani*'.

(15 marks)

c) Assume that '*Rani*' was originated from a single Bean plant which was heterozygous for four (04) loci governing seed weight. Calculate, using standard equations, how many pure lines can be isolated from it.

(05 marks)

2. Write short notes on any three (03) of the following:

a) Hybrid vigour (or heterosis)

b) Inbreeding depression

c) Genotype and Phenotype

d) Characters and Traits

(25 marks)

3.

a) Suppose that you have an elite canola (*Brassica napus*) variety called *CanE1* which is very popular in the market. Unfortunately this variety is susceptible to a fungal disease called 'mildew'. A wild canola variety called *CanW* is 'mildew' resistant but has no market value. The resistance in *CanW* is due to a dominant gene called *R*, which is homozygous. Describe a non transgenic breeding method to incorporate the gene R to your elite canola variety *CanE1*.

(20 marks)

b) Discuss the merits and demerits of your method.

(05 marks)

4.

a. What are polyploids?

(05 marks)

b. Briefly describe how natural polyploids are created?

(10 marks)

c. Explain how polyploidy is induced artificially?

(05 marks)

d. Why polyploids are important in plant breeding?

(05 marks)