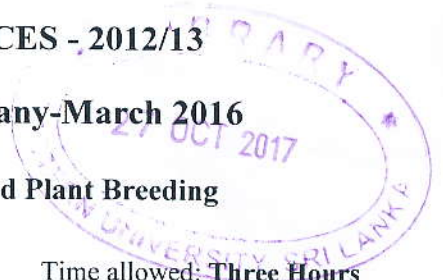


EASTERN UNIVERSITY OF SRI LANKA

THIRD YEAR EXAMINATION IN SCIENCES - 2012/13

Third Year Special Degree Examination in Botany-March 2016

BTS18 – Molecular Genetics, Genetic Engineering and Plant Breeding



Answer all questions.

Time allowed: **Three Hours**

Molecular Genetics, Genetic engineering

- a. Using a diagram, explain how a polynucleotide chain of DNA is formed. **(30 marks)**
- b. Briefly discuss the features of the DNA double helix with reference to its polynucleotide structure. **(40 marks)**
- c. Briefly describe the forces involved in DNA helices. **(30 marks)**

Write short notes on the following:

- a. Genetic code. **(40 marks)**
- b. RNA. **(30 marks)**
- c. Restriction enzymes. **(30 marks)**

- a. What is a transgenic or GM plant? **(20 marks)**
- b. Give an over view of producing a transgenic plant and explain the purpose of each step. **(30 marks)**
- c. Briefly discuss the 'advantages' and 'disadvantages' of GMOs. **(50 marks)**

- a. Describe the characteristics of a good vector for cloning. **(20 Marks)**
- b. Using a labeled diagram show how a new gene is cloned and identified at the end of cloning procedures. **(30 Marks)**
- c. With the help of suitable diagram/s explain briefly how a genetically modified plant is produced using *Agrobacterium* sp. **(50 marks)**

B. Plant Breeding

5. Discuss the Following

- (a) Pattern of evolution in cultivated crop species, (50 marks)
- (b) Development of hybrid varieties in maize (*Zea mays*) crop. (50 marks)

6. Explain:

- (a) Heritability and its importance in plant breeding, (30 marks)
- (b) Genetic male sterility and its maintenance, (30 marks)
- (c) Basic genetic resources. (40 marks)