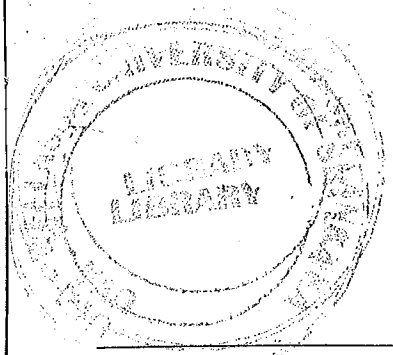

Uva Wellassa University, Sri Lanka
End Semester Examination – June/July 2010
SCT 214-1 Genetics (Repeat)

Time: One (01) hour

Total Five **(05)** Questions
Answer **Four (04)** questions only

1. (a) Draw a labeled diagram to illustrate the structural organization of prokaryotic gene and eukaryotic gene.

(10 marks)

(b) A group of PhD students, working on rice genome project in California University, wanted to find out the possible m-RNA which was generated from a particular DNA segment that they isolated from rice (*Oryza sativa*) root. The sequence of one strand (strand 'A') of that segment is as follows.

-AGCTTGGCTATAGTCAAATGGC-

Predict the opposite (complementary) DNA sequence (strand 'B') and write the possible m-RNA sequence which is derived from the strand 'B'. (15 marks)

2. (a) Briefly explain the direct and indirect gene transformation methods.

(6 marks)

(b) What are the benefits and possible risks of GMO?

(6marks)

(c) Insulin is a hormone produced by the pancreas, and is essential for the regulation of glucose in the body. In 1982, the first biotechnologically produced insulin- named "Humulin" was put on the market. Explain briefly the major steps of producing insulin using DNA recombinant technology.

(13 arks)

3. Certain genetic abnormality expresses by having x- linked dominant allel.

Abnormal woman get married to a man who is not abnormal and from that marriage they got two offsprings. The first offspring is a female who is not expressing abnormal condition. That normal female get married to a abnormal man and their first abnormal female offspring get married to a abnormal man and they got two female offspring both having abnormal condition.

(a) . Draw the pedigree and find the genotypes. (20 marks)

(b) . What is the probability of having normal male offspring in progeny three? (3 marks)

(c) . What is the benefit of analyzing pedigree of an organism? (2marks)

4. Write short notes on followings.

(a). Chromosomal mutations. (9marks)

(b). Di hybrid cross. (9marks)

(c). Incomplete dominance. (7marks)

5. (a). What is the cell cycle and explain the major phases **very briefly.** (8 marks)

(b). List out the similarities and differences between meiosis and mitotic cell divisions. (17marks)