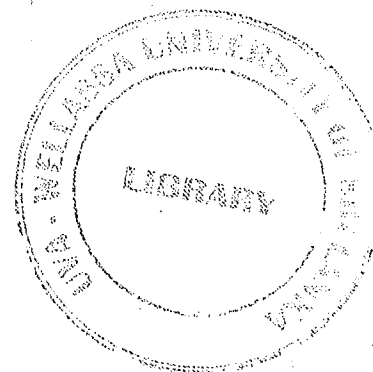


Uva Wellassa University, Sri Lanka
B.Tech. Degree Programme - 2006/07
End Semester Examination –Semester II
June 2008



BIO 201-1 Cell and Genetics

Answer only four (04) questions

Time – One(01) hour

1. (a). State the major steps of post transcriptional modifications (mRNA processing).
(6 marks)
- (b). With suitable diagrams, explain in detail the process of translation.
(19 marks)
2. Tasmanian devils, three recessive mutations are **h**(hairy nostrils), **r** (rat tail), and **f** (short fang). Outline the cross between a devil with hairy nostrils and rat tail with a devil with short fangs. From the data below, determine the map for the genes.
(25 marks)

Phenotype	Number
HRF	73
hrf	63
Hrf	96
hRF	110
HrF	2
hRf	2
hrF	306
HRf	348

3. (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)

4. (a). Explain about the direct and indirect gene transformation methods **very briefly**.
(6marks)

(b). What are the **benefits** and possible **risks** of GMO?
(8 marks)

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

(11 marks)

5. (a). What is the major difference between prokaryotic gene organization (structure) and eukaryotic gene organization.

(5marks)

(b). A group of PhD students, working on rice genome project in California University, wanted to find out the possible proteins which were generated from a particular DNA segment that they isolated from rice(*Oryza sativa*) root. That segment is (non coding strand) as follows.

-AGCTTGGCTATAGTCAAATGGC-

Predict the three possible proteins.

(20 marks)

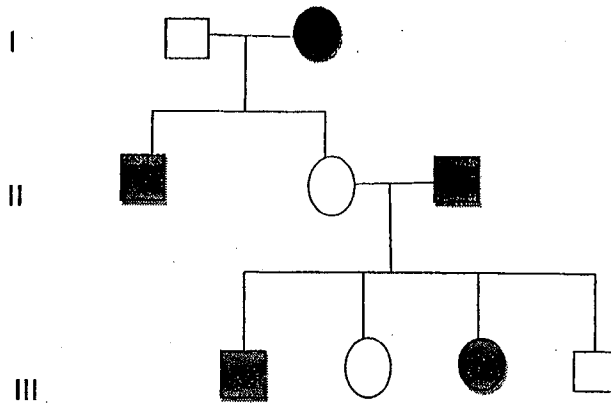
(Genetic code is provided)

6. (a). The common grackle is a species of robin-sized blackbirds that are fairly common (hence the name) over most of the United States. Suppose that long tails (L) were dominant to short tails in these birds. A female short-tailed grackle mates with a male long-tailed grackle that had one parent with a long tail and one parent with a short tail. What is the male's genotype? What is the expecting phenotypic ratio in F1 generation?

(12marks)

- (b). The following pedigree follows the inheritance of a certain x linked recessive gene which causes a particular genetic disease.

- Find out the relevant genotypes
- Probability of the 1st child, having the disease in progeny III



(13 marks)

Genetic code

	U	C	A	G
U	UUU — Phe UUC — Phe UUA — Leu UUG — Leu	UCU — Ser UCC — Ser UCA — Ser UCG — Ser	UAU — Tyr UAC — Tyr UAA — Stop UAG — Stop	UGU — Cys UGC — Cys UGA — Stop UGG — Trp
C	CUU — Leu CUC — Leu CUA — Leu CUG — Leu	CCU — Pro CCC — Pro CCA — Pro CCG — Pro	CAU — His CAC — His CAA — Gln CAG — Gln	CGU — Arg CGC — Arg CGA — Arg CGG — Arg
A	AUU — Ile AUC — Ile AUA — Ile AUG — Met	ACU — Thr ACC — Thr ACA — Thr ACG — Thr	AAU — Asn AAC — Asn AAA — Lys AAG — Lys	AGU — Ser AGC — Ser AGA — Arg AGG — Arg
G	GUU — Val GUC — Val GUA — Val GUG — Val	GCU — Ala GCC — Ala GCA — Ala GCG — Ala	GAU — Asp GAC — Asp GAA — Glu GAG — Glu	GGU — Gly GGC — Gly GGA — Gly GGG — Gly

Ala: Alanine	Cys: Cysteine	Asp: Aspartic acid	Glu: Glutamic acid
Phe: Phenylalanine	Gly: Glycine	His: Histidine	Ile: Isoleucine
Lys: Lysine	Leu: Leucine	Met: Methionine	Asn: Asparagine
Pro: Proline	Gln: Glutamine	Arg: Arginine	Ser: Serine
Thr: Threonine	Val: Valine	Trp: Tryptophane	Tyr: Tyrosine