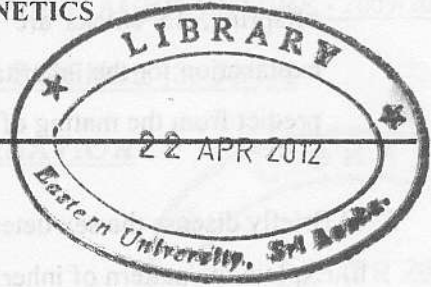


EASTERN UNIVERSITY, SRI LANKA
SECOND YEAR SECOND SEMESTER EXAMINATION IN AGRICULTURE - 2008/2009
(JANUARY/FEBRUARY/MARCH- 2012)
AGB 2202 PRINCIPLES OF GENETICS

Answer all questions

Time allowed: Three hours



1. a) Define the following terms;
 - (i) Genome imprinting
 - (ii) Gene expression
 - b) Explain the behaviour of chromosomes during prophase I, metaphase I and anaphase I in meiosis.
 - c) Give brief description on the behavior of polygenes in higher plants.
2. a) State 'Hardy-Weinberg equilibrium' and list out the factors affecting Hardy-Weinberg equilibrium of a population.
 - b) Differentiate missense and nonsense mutations which take place in genetic code.
 - c) Briefly explain trisomy, monosomy and isochromosomal conditions in mammals.
3. a) State Mendelian principle of segregation.
 - b) Flower position, stem length, and seed shape were the characters studied by Mendel. Each is controlled by an independently assorting gene and has dominant and recessive expression as follows;

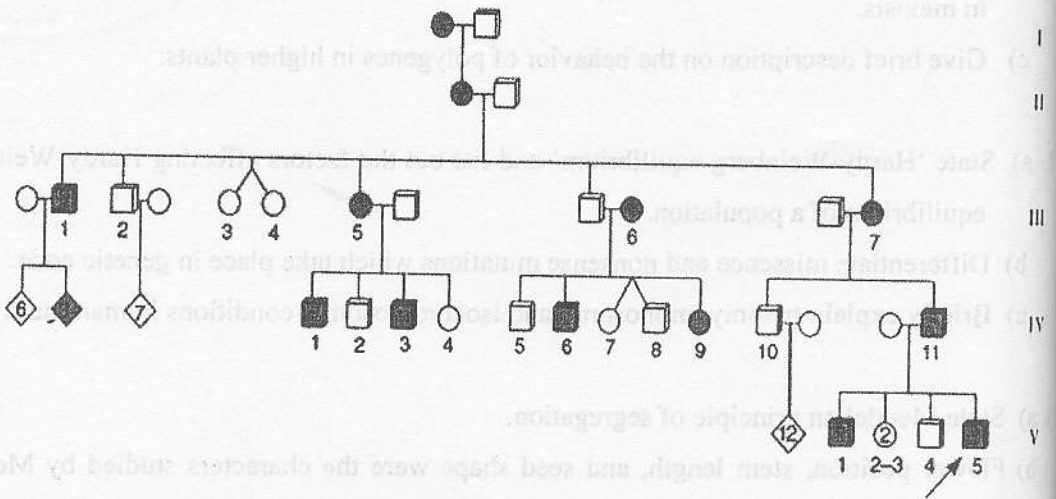
Character	Dominant	Recessive
Flower position	Axial (A)	Terminal (a)
Stem length	Tall (L)	Dwarf (l)
Seed shape	Round (R)	Wrinkled (r)

If a heterozygous plant for all three characters was allowed to self-fertilize, what proportion of the offspring would be expected relevant to the following?

- i. homozygous for the three dominant traits
- ii. homozygous for the three recessive traits
- iii. heterozygous
- iv. homozygous for axial and tall, heterozygous for seed shape

(Note: Use the rules of probability instead of a huge Punnett square.)

4. a) Explain epistasis and codominance with suitable examples and differentiate them.
 b) A rooster with gray feathers is mated with a hen of the same phenotype. Among the offspring, 15 chicks are gray, 6 are black, and 8 are white. What is the simple explanation for the inheritance of these colours in chickens? What offspring would you predict from the mating of a gray rooster and a black hen?
5. a) Briefly discuss the sex determination mechanism in higher plants.
 b) Explain the pattern of inheritance of the trait using the following pedigree tree



6. Write short notes on,

- Importance of Genome mapping
- Non-mendelian inheritance
- Gene transfer in higher plants

Character	Flower position	Stem length	Seed shape
Terminal	Axial	Tall	Round (R)
Axial	Axial	Short	Wrinkled (r)