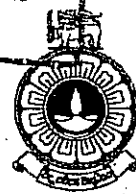


15 JUL 2006  
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THE OPEN UNIVERSITY OF SRI LANKA

B. Sc. DEGREE PROGRAMME – LEVEL 04 – 2005/2006

Botany – BTU 2102/ BTE 4102 – Genetics, Evolution & Introductory Molecular Biology

ASSESSMENT TEST 1 – OPEN BOOK TEST (OBT)

Reg. No. -----

DURATION : ONE HOUR (3.30 – 4.30.p.m.)

DATE : 15.07.2006

**ANSWER ALL QUESTIONS**

(This paper contains three (03) questions and four (04) pages)

1. The shape and the colour of radishes are controlled by two independent pairs of alleles that show no dominance; each genotype is distinguishable phenotypically. The colour may be red ( $RR$ ), purple ( $R'R$ ), or white ( $R'R'$ ) and the shape may be long ( $LL$ ), oval ( $L'L$ ) or round ( $L'L'$ ).

Using the Punnet square method, diagram a cross between red, long ( $RRLL$ ) and white, round ( $R'R'L'L'$ ) radishes and summarize the  $F_2$  results under the headings phenotypes, genotypes, genotypic frequency, and phenotypic ratio

a) THE PUNNET SQUARE

UAA  
UGA  
UGA

stop

b) PHENOTYPES      GENOTYPES      GENOTYPIC FREQUENCY      PHENOTYPIC RATIO

2. The gene (*w*) for white eyes in *D. melanogaster* is recessive and sex-linked; males are heterogametic.

a) Symbolize on the chromosomes the genotype of a white-eyed male, red-eyed male, red-eyed female (two genotypes), and white-eyed female.

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3. A woman has a rare abnormality of the eyelids called ptosis. It makes impossible for her to open her eyes completely. The condition has been found to depend on a single dominant gene ( $P$ ). The woman's father had ptosis, but her mother had normal eyelids. Her father's mother had normal eyelids.

a) What are the probable genotypes of the woman, her father, and her mother ?

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b) What proportion of her children will be expected to have ptosis if she marries a man with normal eye lids ?

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