



THE OPEN UNIVERSITY OF SRI LANKA  
B. Sc. DEGREE PROGRAMME – LEVEL 04 – 2004/2005  
Botany – BTU 2102/ BTE 4102 – Genetics, Evolution & Introductory Molecular Biology

ASSESSMENT TEST 1 – OPEN BOOK TEST (OBT)

Reg. No. -----

DURATION : ONE HOUR (4.00-5.00.p.m.)

DATE : 19.02.2006

**ANSWER ALL QUESTIONS**

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

1. A homozygous Rh-positive man ( $RR$ ) married an Rh-negative ( $rr$ ) woman. Their first child was normal and their second child had the hemolytic disease of the newborn.

a) What genetic explanation might be given for this ?

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b) What prediction might be made concerning future children by this couple ?

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c) Explain briefly what happens if a Rh<sup>+</sup> man marries a Rh<sup>-</sup> woman?

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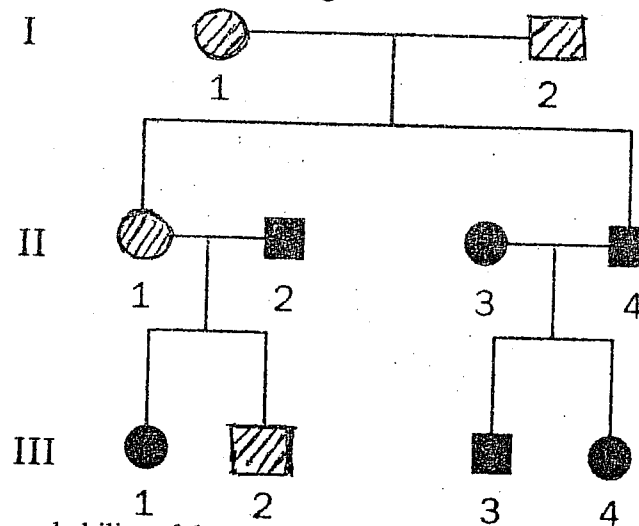
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2. The trait represented by lined squares and circles in the following pedigree chart is inherited through a single dominant gene.



Calculate the probability of the trait appearing in the offspring in the marriages?

a) III - 1 X III - 3

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b) III - 2 X III - 4

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c) Indicate the genotypes of each individual in the pedigree chart given above.

3. Female *Drosophila* heterozygous for ebony ( $e^+ / e$ ), scarlet ( $st^+ / st$ ), and spineless ( $ss^+ / ss$ ) were testcrossed, and the following progeny were obtained :

Progeny Phenotype	Number
Wild type	67
Ebony	8
Ebony, scarlet	68
Ebony, spineless	347
Ebony, scarlet, spineless	78
Scarlet	368
Scarlet, spineless	10
Spineless	54

a) Are these genes linked ? Justify your answer.

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b) Write the genes given on a chromosome symbol with the genes in correct order.

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c) Write the genotypes of the flies involved in the parental cross and test cross.

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d) What is the map distance between the loci for ebony and scarlet ?

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e) What is the map distance between the loci for ebony and spineless ?

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