

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 : .23. 03. 2006

ANSWER ALL QUESTIONS

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

1. White fruit colour in summer squash is dependent on a dominant allele (W), and coloured fruit on the recessive allele (w). In the presence of ww and a dominant gene (G), the colour is yellow, but when G is absent (*ie.* gg), the colour is green.

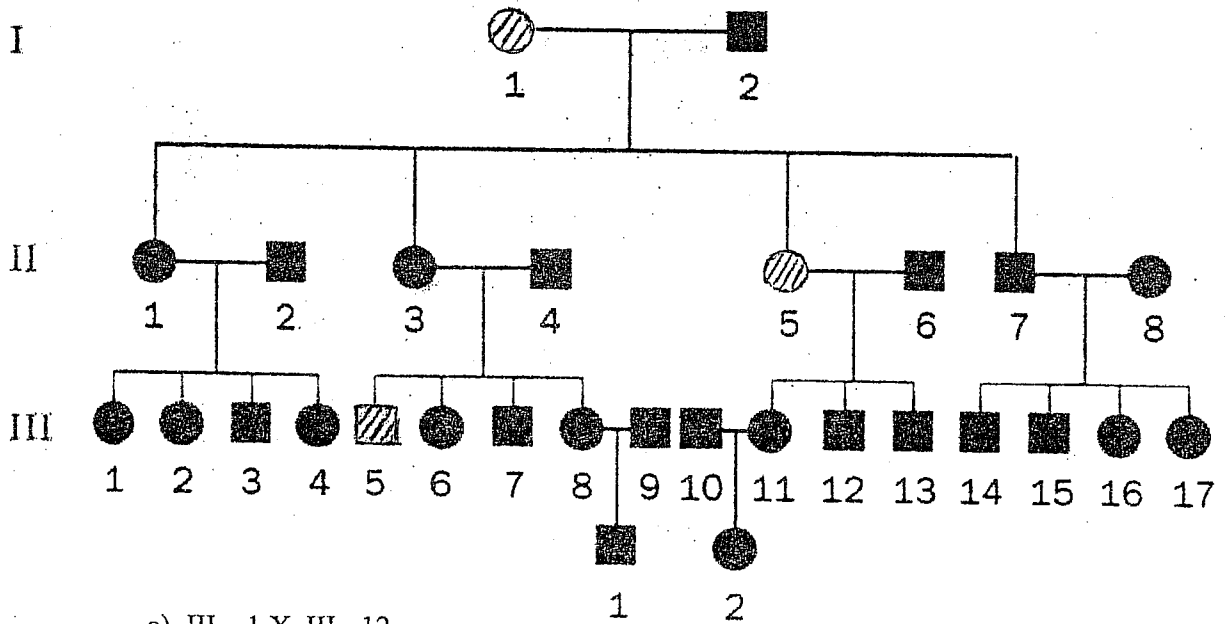
- a) Give the F_2 phenotypes that are expected from crossing a white-fruited ($WWGG$) plant with a green-fruited ($wwgg$) plant?

- b) Give the proportions of F_2 of the above cross in (a).

- c) Indicate the genetic phenomenon which could explain the above (a) and (b) results.

2. In the family pedigree shown in the following chart, an abnormal trait is inherited as a simple recessive. Unless there is evidence to the contrary, assume that the individuals who have married into this family do not carry the recessive gene for the trait. Lined squares and lined circles represent expressions of the trait.

Calculate the probability of the trait appearing in a given offspring if the following cousins and second cousins in generations III and IV should marry :



a) III-1 X III-12

b) III-4 X III-14

c) III-6 X III-13

d) IV - 1 X IV - 2

3. Singed bristles (*sn*), crossveinless wings (*cv*), and vermilion eye colour (*v*) are due to recessive mutant alleles of three sex-linked genes in *Drosophila melanogaster*. When a female heterozygous for each of the three genes was test-crossed with a singed, crossveinless, vermilion male, the following progeny were obtained :

Progeny Phenotype	Number
Singed, crossveinless, vermilion	3
Crossveinless, vermilion	392
Vermilion	34
Crossveinless	61
Singed, crossveinless	32
Singed, vermilion	65
Singed	410
Wild type	3

Total =	1000

- a) What is the correct order of the three genes on the chromosome ?

- b) What is the genetic map distances between *sn* and *cv* ?
What is the genetic map distances between *sn* and *v* ?
What is the genetic map distances between *cv* and *v* ?

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