



THE OPEN UNIVERSITY OF SRI LANKA

B. Sc. DEGREE PROGRAMME – LEVEL 04 – 2007/2008

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

ASSESSMENT TEST 1 – OPEN BOOK TEST (OBT)

DURATION : ONE HOUR

Reg. No. -----

DATE : 8th September 2007

TIME : 4.00 p.m. – 5.00 p.m.

ANSWER ALL QUESTIONS

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



1.

a) What is heritability ?

b) What is the relationship between heritability and environment ?

- c) The total genetic variance of 180 day body weight in a population of swine is 250 lb^2 . The environmental variance is 350 lb^2 . What is the heritability estimate of this trait ?

2.

- a) What is epistasis ?

b) Coat colours of dogs depend on the action of at least two genes. At one locus an inhibitor of coat colour pigment (I-) prevents the expression of colour alleles at another independently assorting locus, producing white coat colour. When the recessive condition exists at the inhibitor locus (ii), the alleles of the hypostatic locus may be expressed, iiB- producing black and iibb producing brown. When dihybrid white dogs are mated together,

- i) What are the phenotypic proportions expected in the progeny ?

ii) Name the type of genetic interaction found in question b (i).

iii) What is the chance of choosing from among the white progeny, a genotype homozygous at both loci ?

3. In wheat, two pairs of genes ie. A/a and B/b were considered in a breeding programme. An F₁ progeny resulting from a cross between two homozygous wheat were testcrossed.

The following testcross progeny was observed,

<i>AB</i>	820
<i>Ab</i>	288
<i>aB</i>	291
<i>ab</i>	811

- a) Are these two genes linked? If yes, explain your answer.

- b) If the two genes are linked, state the amount of recombination occurred between them.

- c) State the genotypes of the original parents produce the F₁ s.

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