

2010 HIGHER SCHOOL CERTIFICATE EXAMINATION

Biology

Section I (continued)

Part B – 55 marks

Attempt Questions 21–30

Allow about 1 hour and 40 minutes for this part

Answer the questions in the spaces provided. These spaces provide guidance for the expected length of response.

Question 21 (2 marks)

Gregor Mendel and Thomas Morgan both used breeding experiments to deduce fundamental principles of genetics.

Complete the four blank boxes in the table.

2

	Mendel's Monohybrid Cross	Morgan's Fruit Fly Experiments																		
First Cross Parents Phenotype	tall × short	red eyed female × white eyed male																		
First Cross (F <sub>1</sub> ) Parents Genotype	$TT \times tt$	$X^R X^R \times X^r Y$																		
First Cross Punnet Square	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>t</td> <td>t</td> </tr> <tr> <td>T</td> <td>Tt</td> <td>Tt</td> </tr> <tr> <td>T</td> <td>Tt</td> <td>Tt</td> </tr> </table>		t	t	T	Tt	Tt	T	Tt	Tt	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td><math>X^r</math></td> <td>Y</td> </tr> <tr> <td><math>X^R</math></td> <td><math>X^R X^r</math></td> <td><math>X^R Y</math></td> </tr> <tr> <td><math>X^R</math></td> <td><math>X^R X^r</math></td> <td><math>X^R Y</math></td> </tr> </table>		$X^r$	Y	$X^R$	$X^R X^r$	$X^R Y$	$X^R$	$X^R X^r$	$X^R Y$
	t	t																		
T	Tt	Tt																		
T	Tt	Tt																		
	$X^r$	Y																		
$X^R$	$X^R X^r$	$X^R Y$																		
$X^R$	$X^R X^r$	$X^R Y$																		
F <sub>1</sub> Phenotype	All Tt = All Tall	$X^R X^r : X^R Y = 1:1$ 2 red eyed females, 2 red eyed males																		