

Mark Scheme (RESULTS)

June 2008

GCE

GCE Biology (6103/02)

GENERAL INFORMATION

The following symbols are used in the mark schemes for all questions:

Symbol	Meaning of symbol
; semi colon	Indicates the end of a marking point
eq	Indicates that credit should be given for other correct alternatives to a word or statement, as discussed in the Standardisation meeting
/ oblique	Words or phrases separated by an oblique are alternatives to each other
{ } curly brackets	Indicate the beginning and end of a list of alternatives (separated by obliques) where necessary to avoid confusion
() round brackets	Words inside round brackets are to aid understanding of the marking point but are not required to award the point
[] square brackets	Words inside square brackets are instructions or guidance for examiners

Crossed out work

If a candidate has crossed out an answer and written new text, the crossed out work can be ignored. If the candidate has crossed out work but written no new text, the crossed out work for that question or part question should be marked, as far as it is possible to do so.

Spelling and clarity

In general, an error made in an early part of a question is penalised when it occurs but not subsequently. The candidate is penalised once only and can gain credit in later parts of the question by correct reasoning from the earlier incorrect answer.

No marks are awarded specifically for quality of language in the written papers, except for the essays in the synoptic paper. Use of English is however taken into account as follows:

- the spelling of technical terms must be sufficiently correct for the answer to be unambiguous
e.g. for amylase, 'ammalase' is acceptable whereas 'amylose' is not
e.g. for glycogen, 'glicojen' is acceptable whereas 'glucagen' is not
e.g. for ileum, 'illeum' is acceptable whereas 'ilium' is not
e.g. for mitosis, 'mytosis' is acceptable whereas 'meitosis' is not
- candidates must make their meaning clear to the examiner to gain the mark.
- a correct statement that is contradicted by an incorrect statement in the same part of an answer gains no mark - irrelevant material should be ignored.

Question Number	Answer	Mark																																								
1(a)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Distance of grapefruit from rainforest / metres</th> <th colspan="4">Number of bee visits / branch⁻¹ 15 minutes⁻¹ on days</th> <th rowspan="2">Mean number of bee visits / 15 minutes⁻¹</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Edge / 0</td> <td>10</td> <td>8</td> <td>6</td> <td>9</td> <td>8.25</td> </tr> <tr> <td>10</td> <td>12</td> <td>7</td> <td>3</td> <td>8</td> <td>7.50</td> </tr> <tr> <td>100</td> <td>9</td> <td>9</td> <td>4</td> <td>11</td> <td>8.25</td> </tr> <tr> <td>500</td> <td>8</td> <td>7</td> <td>3</td> <td>6</td> <td>6.00</td> </tr> <tr> <td>1000</td> <td>1</td> <td>1</td> <td>0</td> <td>1</td> <td>0.75</td> </tr> </tbody> </table> <p>neat table correctly formatted (shaded area optional) ;</p> <p>correct rows and columns with labels and units ;</p> <p>mean average values correctly calculated ;;</p>	Distance of grapefruit from rainforest / metres	Number of bee visits / branch ⁻¹ 15 minutes ⁻¹ on days				Mean number of bee visits / 15 minutes ⁻¹	1	2	3	4	Edge / 0	10	8	6	9	8.25	10	12	7	3	8	7.50	100	9	9	4	11	8.25	500	8	7	3	6	6.00	1000	1	1	0	1	0.75	(4)
Distance of grapefruit from rainforest / metres	Number of bee visits / branch ⁻¹ 15 minutes ⁻¹ on days				Mean number of bee visits / 15 minutes ⁻¹																																					
	1	2	3	4																																						
Edge / 0	10	8	6	9	8.25																																					
10	12	7	3	8	7.50																																					
100	9	9	4	11	8.25																																					
500	8	7	3	6	6.00																																					
1000	1	1	0	1	0.75																																					

Question Number	Answer	Mark
1(b)	<p>Axes - correct orientation and labels ;</p> <p>Scale - use more than half paper and correct scale matched to graph format;</p> <p>Plots - all points plotted correctly ;</p> <p>Format - bar chart / line graph with accurate lines;</p>	(4)

Question Number	Answer	Mark
1(c)	<ol style="list-style-type: none"> 1. general point as distance increases number of bee visits decreases / eq ; 2. 0 to 100 metres: bee visits fluctuate / reference to bee visits decreasing at 10m / eq ; 3. 500 to 1000 metres: greatest decrease [not rapid] ; 4. correct manipulation of numbers ; 	max (3)

Question Number	Answer	Mark
1(d)	<ol style="list-style-type: none">1. different pairs counting bees at each site /eq ;2. no definition of 'bee visits' ;3. identification of insects as bees ;4. no account taken of named environmental condition (e.g. cloud, sun, shade, rain, wind) ;5. height / aspect of branches may be different ;6. variation in flowers (e.g. number, size) ;	max (3)

Question Number	Answer	Mark
2(a)	<ol style="list-style-type: none"> 1. TWO methods of standardising leaves e.g. same plant / species, same position on branch, mass, area, width ; 2. leaves placed in dark for stated time ; 3. same volume of potassium chloride solution for each test ; 4. minimum of 5 different concentrations used in addition to control ; 5. deionised/distilled water (as control) ; 6. leaves placed in solutions for same time ; 7. underside of leaf {painted with nail varnish /eq} / lower epidermis peeled off ; 8. site of stomatal sampling stated for each leaf ; 9. use same magnification / objective lens for each measurement ; 10. count total of stomata visible ; 11. count stomatal numbers open / closed ; 12. min. three counts in total for each leaf ; 13. details of exactly what is to be counted / how open or closed to be judged ; 	max (9)

Question Number	Answer	Mark
2(b)	<ol style="list-style-type: none"> 1. suitable table with units and correct rows and columns to include all raw data to match suggested method ; 2. calculation of % open/closed ; 3. line graph format ; 4. correct orientation of axes with labels and units ; 	max (3)

Question Number	Answer	Mark
2(c)	<p>Limitations</p> <ol style="list-style-type: none"> 1. difficult to judge open / closed ; 2. changes may take place during time for measurement ; 3. leaves not normally immersed in liquid / eq ; 4. chloride ions also present may have an effect ; 5. area observed may not be representative of whole leaf / eq ; <p>Further Work</p> <ol style="list-style-type: none"> 1. repeat with different potassium salt solutions ; 2. test different species of leaves ; 3. measure actual sizes of stoma over time (if not included in method) ; 	max (6)