

Mark Scheme (Results) Summer 2007

GCE

GCE Biology (6103/02)

General Principles

Symbols used in the mark scheme

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. It is used because it is not always possible to list every alternative answer that a candidate may write that is worthy of credit.
/ 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 1

Maximum mark

(a)

Initial mass of shells / g	Final mass of shells (after immersing in 0.4 mol dm^{-3} for 5 minutes) / g	% change in mass
0.85	0.05	94.1 (94 / 94.12)
2.04	1.26	38.2 (38 / 38.24)
2.50	1.61	35.6 (36 / 35.60)
1.82	1.18	35.2 (35 / 35.16)
1.02	0.21	79.4 (79 / 79.41)
1.18	0.40	66.1 (66 / 66.10)
1.55	0.76	51.0 (51 / 50.97)
2.30	1.47	36.1 (36 / 36.09)

Suitable table format ;

Rows and columns with correct headings and units ;

All percentages correct ; ; [1 error = 1 mark, 2 errors = 0 marks]

4 marks

(b) F Format line graph / bar chart ;

A Axes correct - scale, orientation and labelled with units ;

P (All) points plotted correctly ;

L Suitable line point to point / good curve / bars accurate ;

4 marks

(c) 1. Percentage decrease in mass falls as original shell mass increases ;

2. Values quoted to support main trend ;

3. Steepest fall in percentage change in mass for shell mass between 0.85 and 1.18 grams / fall less steep from shell mass of 1.18 g ;

4. Effect at higher (initial) shell mass decreases / above {1.82 / 2.04} g ;

5. Manipulation of data (simple subtraction of 2 data points is sufficient) ;

6. Anomaly at shell size of 1.82 grams /eq ;

4 marks

Question 1 continued

Maximum mark

- (d)
1. Shells may have been exposed to the environment for different periods (before experiment) ;
 2. Shells may be from different {types / species} of snail ;
 3. Shells not dried / eq (before or after weighing) ;
 4. Surface area may vary ;

2 marks

Total 14 marks

Question 2**Maximum mark**

- (a)
1. Suitable method of selecting identical seeds / seedlings ;
 2. Seeds sown / seedlings grown with same density/equal distance apart ;
 3. How two named abiotic conditions for growth controlled eg. temp, watering, growth medium ;
 4. Method of controlling light intensity described ;
 5. Use of light meter/probe to measure/monitor light intensity ;
 6. At least 5 different intensities. ;
 7. Allowed to grow for fixed time (min 1 week) ;
 8. Details of standard method of selecting leaves ;
 9. Use of clear nail varnish peels / epidermal peels ;
 10. (Nail varnish applied) to fixed position on leaf ;
 11. Use of graticule to measure area of field of view of microscope /eq ;
 12. Numbers of stomata (in field of view) counted ;
 13. At least 3 times ;
 14. Method of measuring total leaf area ;

9 marks

- (b)
1. Suitable table with units and correct rows and columns to include raw data which matches suggested method ;
 2. Mean numbers of stomata (per unit area calculated) ;
 3. Correct graphical format matches method ;
 4. Correct orientation of axes with labels and units ;

3 marks

Question 2 continued

Maximum mark

(c) Limitations

1. Difficult to standardise plants ;
2. Difficult to ensure all leaves receive equal light intensity ;
3. Density of stomata can vary on different parts of the leaf ;
4. Nail varnish difficult to peel off some leaves / eq ;
5. Density of stomata can vary with age/size of leaf ;

Further work

6. Investigate variation of stomata with age/size of leaf ;
7. Investigate other species of leaf ;
8. Investigate effect of different wavelengths of light ;
9. Measure transpiration rate / porosity of plants ;

6 marks

Total 18 marks