

Mark Scheme (Results)

January 2011

GCE

GCE Biology (6BI07/01)

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- write legibly, with accurate use of spelling, grammar and punctuation in order to make the meaning clear
- select and use a form and style of writing appropriate to purpose and to complex subject matter
- organise information clearly and coherently, using specialist vocabulary when appropriate.

Full marks will be awarded if the candidate has demonstrated the above abilities.

Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

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 |
| [CE] or [TE] | Consecutive error / transferred error |

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)(i) | <p>A axes correct (x - mineral, y - shoot, root) ;</p> <p>L axes correctly labeled, and with units (mg) ;</p> <p>P correct plotting ; check y-axis for sensible scale, if not; no plotting mark no mark if no key or roots/shoots parts not obvious</p> <p>S bar chart ; (Reject stacked bar graph for this mark)</p> <p>(NOTES: Maximum 3 marks for line of any kind Roots vs shoots = 0)</p> | (4) |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 1(a)(ii) | <p>207 x 9 ;</p> <p>1863 (mg) ;</p> <p>Note: 2 marks for correct answer 1 mark for incorrect answer but correct working</p> | (2) |

| Question Number | Answer | Mark |
|-----------------|---|--------------------|
| 1(a)(iii) | <p>1. {total / shoot / root / all eq} dry mass(es) less than all minerals (once only);</p> <p>Magnesium:</p> <p>2. credit comparative use of figures e.g. root growth down by 110 mg / shoot growth down by 157 mg / total growth down by 167 mg ;</p> <p>3. reference to needed to make chlorophyll ;</p> <p>4. reference to effect on photosynthesis ;</p> <p>Nitrate:</p> <p>5. credit comparative use of figures e.g. root growth down by 64 mg / shoot growth down by 94 mg / total growth down by 158 mg / eq ;</p> <p>6. reference to needed for amino acids / protein / DNA / chlorophyll ;</p> <p>7. reference to effect on {metabolism / growth / eq} ;</p> | <p>max (6)</p> |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 1(b)(i) | <p>idea that any differences between seedling masses later were caused by the treatment they received and not innate differences at start / to make it valid / allow valid comparison (idea) ;</p> <p>NOTE: (1) reference to fair test / accurate / reliable</p> | <p>(1)</p> |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 1(b)(ii) | <p>the deficient mineral / solution(s) eq ; (reject nutrients)</p> | <p>(1)</p> |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 1(b)(iii) | <p>Any two from the following pairs</p> <ol style="list-style-type: none"> 1. light intensity / wavelength ; 2. light bank / eq / use same bulb ; 3. temperature ; 4. environment chamber / some sensible suggestion about the lab / room /sensible use water bath ; 5. carbon dioxide level / eq ; 6. {cylinder/ enclosed chamber} / eq ; 7. humidity / eq ; 8. reference to enclosed chamber ; 9. wind speed ; 10. reference to {enclosed chamber / fan} ; 11. {source / variety / age / ref genes} of seed / eq ; 12. from same packet / (parent) plant / eq ; 13. pH (of mineral solution) ; 14. Use buffer ; 15. Same concentration ((l) amount / volume) of all other minerals / minerals not omitted ; 16. Use same concentration as in complete solution each time ; | max (4) |

| Question Number | Answer | Mark |
|-----------------|---|------|
| 1(b)(iv) | <ol style="list-style-type: none"> 1. remove water by placing in oven for sensible time (24 hours or so / at sensible temp (100°C or so) / eq ; 2. until constant mass idea ; <p>NOTE (l) Filter paper, evaporation</p> | (2) |

| Question Number | Answer | Mark |
|-----------------|--|--------------------|
| 2(a)(i) | <p>Graph A:</p> <ol style="list-style-type: none"> 9-12 18 ; this is where rise in global carbon dioxide is mentioned ; <p>Graph B:</p> <ol style="list-style-type: none"> 2-3 / 51 mentions increasing acidity in oceans ; <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 7-12 / 45-46 mentions fall in pH ; <p style="text-align: center;">OR</p> <ol style="list-style-type: none"> 9; increase in hydrogen ions / eq ; | max (4) |

| Question Number | Answer | Mark |
|-----------------|---|--------------------|
| 2(a)(ii) | <p>Graph A:</p> <ol style="list-style-type: none"> does not support the statement / eq ; idea that this is atmospheric CO₂ not ocean CO₂ ; <p>Graph B:</p> <ol style="list-style-type: none"> supports this statement because the pH is decreasing / eq ; does not support this statement because {there is a lot of variation / only one ocean } / eq ; <p>Both graphs:</p> <ol style="list-style-type: none"> a rise in carbon dioxide is correlated with a fall in pH / eq ; but one might not be cause of other / eq ; | max (4) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 2(b) | <p>Social:</p> <p>Line 30 ; Loss of homes/ lives ;</p> <p>Economic:</p> <p>Lines 25-30 ; Loss of revenue {from tourism / because of loss of corals} / loss of jobs ;</p> | max (2) |

| Question Number | Answer | Mark |
|-----------------|---------------|------|
| 2(c)(i) | (78/6 =)13 ; | (1) |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 2(c)(ii) | <ol style="list-style-type: none"> 1. bar graph ; 2. Y = wave energy and X = year ; 3. plot the means ; 4. plot error bars / SD / range bars; <p>NOTE: Allow line graph</p> | max (2) |

| Question Number | Answer | Mark |
|-----------------|---|------|
| 2(c)(iii) | <p>wave energy increases with time / eq ;</p> <p>idea that extent of change increases rate of change (about) constant / correct manipulation of figures to compare change between years (NOT reefs)</p> | (2) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 2(c)(iv) | <ol style="list-style-type: none"> 1. increased (coastal) erosion / flooding ; 2. loss of home ; 3. loss of human life / fall in human population; 4. loss of infrastructure /suitable example ; 5. habitat loss ; 6. loss of beaches / tourism ; 7. idea of food chain / web effect ; 8. idea of fall in population / migration of a species ; 9. fall in animal / plant population / extinction / migration ; | max (2) |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 2(c)(v) | <p>limited data on which it is based /</p> <p>limited knowledge of the interaction of waves and reefs/</p> <p>not enough computer power /</p> <p>trend might change due to other variables /</p> <p>trend might have been different in past due to other variables</p> <p>reference to reliability /of model in sensible context ;</p> | (1) |

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