

Mark Scheme (Results) Summer 2007

GCE

GCE Biology (6106/03)

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) 1 (blood glucose concentration) increases / eq ;
2 by 2.2 mmol per dm³ / by 44% / by 1.44 times ;
3 glucose is absorbed (into the blood) / eq ;
4 in the {ileum / duodenum / small intestine / stomach / jejunum} ;
- 3 marks**

- (b) 1 they both increase up to (a maximum at) 30 minutes ;
2 (then) decrease /eq ;
- 2 marks**

- (c) 1 reference to (glucose) transporter proteins ;
2 reference to phosphorylation of glucose ;
3 (glycogen synthesis) reduces the concentration of glucose in cell ;
4 this {maintains / increases} the {diffusion / concentration gradient} ;
- 3 marks**

Question 1 continued

Maximum mark

(d) There are four possible named hormones:

- 1 glucagon ;
- 2 increases blood glucose {concentration / level / eq} ;
- 3 by (promoting) glycogenolysis / inhibiting glycogenesis / (stimulating) gluconeogenesis / eq ;

OR

- 1 adrenaline ;
- 2 increases blood glucose {concentration / level / eq} ;
- 3 by (promoting) glycogenolysis / (stimulating) gluconeogenesis / eq ;

OR

- 1 thyroxine ;
- 2 decreases blood glucose {concentration / level / eq} ;
- 3 by increasing cell respiration / eq ;

OR

- 1 cortisol ;
- 2 increases blood glucose {concentration / level / eq};
- 3 by (increasing) gluconeogenesis / eq ;

3 marks

Total 11 marks

Question 2

Maximum mark

- (a) 1 they both decrease /eq ;
2 accept an accurate, manipulated, quantitative reference **for both** ;
2 marks
- (b) 1 calculation ;
2 18.3 ;
2 marks
- (c) 1 consists of (α) glucose + fructose ;
2 joined by a glycosidic bond / glycosidic link ;
2 marks
- (d) 1 acetylcholine is {a (chemical) transmitter substance / a neurotransmitter} ;
2 (insecticide X) will {stop / reduce / eq} the transmission of nerve impulses ;
3 across synapses / blocks the synapse / stops synaptic (transmission) ;
4 no post-synaptic potential generated / ref to permeability of post-synaptic membrane / eq ;
3 marks

Question 2 continued

Maximum mark

- (e)
- 1 reference to toxicity to non-target species / insecticides are non-specific ;
 - 2 reference to (chemical) stability of insecticides ;
 - 3 reference to bioaccumulation ;
 - 4 reference to development of resistance / eq ;
 - 5 reference to resurgence (of pests) / need to re-apply insecticides ;
 - 6 reference to harmful effect on crop ;

3 marks

Total 12 marks

ESSAY MARK SCHEME

Outline scheme for marking essay questions 3, 4B and 5H

11 available for Scientific content (S)

2 available for Balance (B)

2 available for Coherence (C)

Total maximum mark available: 15

Scientific content (S)

Scientific content (S)	Description
11 (good)	The essay demonstrates a sound understanding of the topic and contains a significant amount of material from most areas of the mark scheme, including A2 content . Suitable examples are included and the candidate has clearly and coherently linked together information from different parts of the specification.
9 (above average)	An above average essay, with accurate content. The essay includes a good balance of material from several areas of the mark scheme, including A2 content , and examples where appropriate. There may be some minor factual errors.
7 (average)	The essay includes relevant information from some areas of the mark scheme, including A2 content . The candidate links together some facts and principles. Some examples are included. There may be some minor factual errors.
5 (below average)	The essay includes some generally factually accurate and relevant material, and there is some attempt to link material from more than one area of the mark scheme. The A2 content, in particular, lacks depth and accurate details.
3 (poor)	There are some correct facts, but the essay lacks depth and accuracy. The essay contains little or no relevant information from the A2 content .
1 (poor)	There are very few correct facts. The essay is generally superficial and inaccurate.
0 (poor)	No correct or relevant material is included.

Note: If a scientific content mark of 0, 1, or 3 is awarded, it is very unlikely that a balance mark of more than 1 is appropriate.

An essay containing AS content **only** can be awarded a **max of 3** for scientific content.

An essay containing A2 content **only** can be awarded a **max of 7** for scientific content.

S = 11 marks

Balance (B)

- 2 Most of the main topic areas outlined are covered
Some discussion of each of the areas chosen, illustrated with suitable examples where appropriate
Material included is all relevant to the topic and the candidate has linked information from more than one area of the specification.
Few, if any, errors
- 1 Some of the main topic areas outlined are covered.
Some discussion of each of the areas chosen.
Some irrelevant material included.
There are some examples which link together different areas of the specification.
Some errors
- 0 Very limited account, possibly only one aspect chosen
Material mostly irrelevant
No examples of the candidate linking information from different topics
Large number of errors

B = 2 marks**Coherence (C)**

- 2 Material logically presented, with little or no repetition
Essay has coherence, ideas are developed well; continuous prose used throughout
Essay has an introduction and a conclusion, summing up the main points
Technical terms have been used correctly
Spelling, punctuation and grammar are sound
- 1 Material is presented in an orderly way and some ideas developed
Continuous prose used throughout
The introduction and conclusion may be present, but brief
Technical terms are used and generally in the correct context
Spelling, punctuation and grammar are generally sound
- 0 Essay style not used
Material in note form or numbered points
Very poor standard of spelling, punctuation and grammar

C = 2 marks

Question 3

Maximum mark

[A2 content is in bold]

Introduction could include ref to the importance of sexual reproduction giving rise to genetic variation -

Gamete formation involves meiosis - independent assortment

Crossing over -

Random fertilisation -

Mutations giving rise to genetic variation -

Selection pressures act on the gene pool -

Changes in allele frequency in populations -

Stabilising, directional and disruptive selection -

Natural selection giving rise to speciation -

Allopatric speciation -

Sympatric speciation -

Scientific content 11 marks

Balance 2 marks

Coherence 2 marks

Total 15 marks

Question 4B

Maximum mark

[A2 content is in bold]

Introduction could include overview of pollination and chemical control of growth -

Principal parts of an insect pollinated and a grass flower -

Pollination -

Adaptations to insect and wind pollination -

Effects of:

auxins -

cytokinins -

gibberellins -

abscisic acid -

ethene -

Synergism and antagonism -

Phytochrome -

Scientific content 11 marks

Balance 2 marks

Coherence 2 marks

Total 15 marks

Question 5H

Maximum mark

[A2 content is in bold]

Introduction could include reference to the significance of meiosis -

Gamete formation involves meiosis -

First and second divisions of meiosis -

Chiasmata formation -

Translocation -

Non-disjunction -

Polysomy and polyploidy -

Specific reference to **Down's syndrome** -

[Trisomy-21, or 14'21 translocation]

Detection of chromosome mutations and karyotypes -

Scientific content 11 marks

Balance 2 marks

Coherence 2 marks

Total 15 marks