

GCE



Edexcel GCE

Biology / Biology (Human) (6106/03)

Summer 2005

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Mark Scheme (Results)

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Biology / Biology (Human) (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) (i) 16 ; 1 mark

- (ii) 1. Rapid growth / eq ;
2. Uses less energy ;
3. (Daughter) cells adapted for (existing) conditions / eq ;
4. Only one parent cell needed ;
5. Maintains same genetic strain / eq ; 3 marks

- (iii) 1. Reference to {glycoproteins / glycolipids / proteins / antigens / glycocalyx} ;
2. Reference to receptors ;
3. Reference to specificity between proteins and receptors ; 3 marks

(b) (i) Inner membrane / crista(e) ; 1 mark

- (ii) 1. No aerobic respiration / anaerobic respiration only / glycolysis only ;
2. As ETC cannot function ;
3. No oxidative phosphorylation ;
4. (Therefore) less ATP produced ;
5. Reference to fewer anabolic reactions / e.g. {protein synthesis / cell division / active transport} ;
6. Reference to ethanol produced which may inhibit (growth) ; 3 marks

(c) That it is due to a {mutation / deletion / eq} in the mitochondrial DNA ; 1 mark

Total 12 marks

Question 2**Maximum mark**

- (a) (i) 1. Bacteria {remain attached to filter paper / not dispersed in solution / more stable} ;
2. So that luminescence is easier to see / eq ;
3. Can be removed easily ;
- (ii) 1. (Changes in temperature) affect enzyme (activity) ;
2. Affect {metabolism / respiration / bioluminescence / eq} ;
3. May affect uptake of {ions / metals / eq} ;

4 marks

- (b) As concentration increased, light emitted decreased / converse ;
- 0.05 mg dm⁻³ had no effect (within 5 hours) / 10.0 mg dm⁻³ inhibited light emission within 30 mins / equivalent statement about other concentration ;

2 marks

- (c) Mercury (chloride) ;
- More {rapid effect / effective at lower concentrations} (than other metals) / eq ;

2 marks

- (d) 1. Set up with filter paper disc plus bacteria in water sample ;
2. Reference to use of a control ;
3. Keep (both) {at the same temperature / in dark} ;
4. Record duration of light emission ;
5. Expect shorter duration (than control) if water had been polluted / eq ;

3 marks**Total 11 marks**

ESSAY MARK SCHEME

Outline Scheme for Marking Essay Questions 3, 4B and 5H

Total maximum mark available: 15

11 available for Scientific content

2 available for Balance

2 available for Coherence

Scientific content (S)

Scientific content (S)	Description
11 (good)	The essay demonstrates a sound understanding of the topic, contains a significant amount of material relevant to two (or more) Units (including A2 units) of the specification, and includes suitable examples where appropriate. 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 two (or more) Units (including the A2 units), and examples where appropriate. There may be some minor factual errors.
7 (average)	The essay includes relevant information from two (or more) Units (including A2 units), and 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 Unit. However, the discussion lacks details, particularly of A2 Units.
3 (poor)	There are some correct facts, but the essay lacks depth and accuracy. Little or no relevant information from A2 Units is included.
1 (poor)	There are very few correct facts. The essay is generally superficial and inaccurate.
0 (poor)	No correct, or relevant, information 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.

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

Introduction could include reference to the nature of carbohydrates, monosaccharides, disaccharides and polysaccharides -

} Unit 1

Digestion of starch, salivary amylase and pancreatic amylase -

Digestion of maltose -

Digestion of sucrose -

Digestion of lactose -

} Unit 2

Digestion of cellulose in ruminants, saprobiontic digestion -

} Unit 3

Absorption of monosaccharides -

Relationship between structure and function of ileum -

} Unit 2

Absorption of glucose, leading to an increase in blood sugar level -

Roles of insulin, glucagon and adrenaline in control of blood glucose levels -

Roles of the liver in glucose-glycogen metabolism -

} Unit 4

Scientific content 11 marks
Balance 2 marks
Coherence 2 marks

Total maximum 15 marks

Question 4B

Maximum mark

Introduction could include reference to the structure of xylem tissue in plants -

Roles of diffusion and active transport in the uptake of mineral ions -

Structure of the root -

Movement of water (plus dissolved mineral ions) through the plant -

Apoplast, symplast and vascular pathways -

Role of the endodermis -

Functioning of the transpiration stream -

Structure of vessels and their contribution to the movement of water -

Unit 2B

Functions of:

Nitrate ions -

Phosphate ions -

Magnesium ions -

Unit 5B

[some candidates might refer to the transport of mineral ions to sinks in the phloem]

Scientific content 11 marks

Balance 2 marks

Coherence 2 marks

Total maximum 15 marks

Question 5H

Maximum mark

Introduction could include an outline of primate diversity / evolutionary trends -

Range of form of primates illustrated by:

Lemurs, old world monkeys and new world monkeys -

Apes and humans -

Primate features shown by humans, e.g. skeletal structure, forward facing eyes, 3D binocular vision, fingernails, opposable thumbs, relatively large brains -

Environmental conditions in high mountains:

Low atmospheric pressure -

Low temperature -

Low humidity -

High winds -

Increased solar radiation -

Physiological effects of high altitude -

Ways in which humans are adapted to high altitude -

Differences between adaptation and acclimatisation -

Unit 5H

Unit 2H

Scientific content 11 marks
Balance 2 marks
Coherence 2 marks

Total maximum 15 marks