GCE

Edexcel GCE

Biology / Biology (Human) (6103/03)

Summer 2006

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Mark Scheme (Results)

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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.

Unit 3 paper 3 (6103/03)

Question 1 **Maximum mark**

(a)
1. Reference to {saprobiont / saprophytic} ;
2. {Digests/eq} {dead / non-living / eq} material ;
3. {By secreting/eq} {proteases / eq} ;
4. Reference to {hyphae / rhizoids} {absorb /eq} amino acids ;

2 marks

(b)
1. Reference to {mutualism / symbiosis} ;
2. {Fixes nitrogen / reduces nitrogen / reference to nitrogen fixation} to form {ammonia / ammonium / amines} ;
3. Reference to nitrogenase ;
4. {Ammonia / ammonium / amines / product of N-fixation} used to form amino acids ;

2 marks

(c)
1. Reference to parasitism / Lives in {{small intestine / ileum / duodenum} of {host / living organism / named e.g.}} ;
2. Host's {enzymes digest proteins / proteases} (in food) ;
3. Amino acids absorbed through {body surface / eq} ;

2 marks

Total 6 marks

Question 2 **Maximum mark**

(a) (i)

1. Gases {dissolve / eq} ;
2. Ref. to water in {atmosphere/eq} ;
3. pH 5.5 or lower / more acidic / lower than normal / named acid} ;

2 marks

(ii)

1. Readings allow C.E for 2 or more d.p. from graph: 6.7 ± 0.1 and {3.4 ± 0.1} ;
2. Suitable correct working e.g. (3.3 / 6.7) x 100 ;
3. Correct answer e.g. 49(.3) ;

3 marks

(iii)

1. Ref to {legislation/named example};
2. Desulphurisation / removal of {sulphur / sulphur dioxide} ;
3. Increased {natural gas / biogas / low sulphur fuel} ;
4. CAT converters ;
5. Ref to {alternative energy source / renewable} ;
6. More use of {public transport/eq} ;

2 marks

Question 2 continued **Maximum mark**

(b)
1. {Both /eq} increase mortality ;
2. High aluminium mortality lower than low pH mortality / converse ;
3. Idea of low pH and high aluminium have greater effect than sum of the individual effects / eq ;
4. Manipulated data ;

3 marks

(c)
1. {Fewer trout (larvae) survive / trout population falls / eq} ;
2. {Less food / fewer trout to eat / eq} for herons ;
3. Herons {die /move to another area} ;
4. Heron population falls/eq ;
5. Herons eat more {frogs / toads /eq} ;
6. Ref {bioaccumulation /eq} / toxicity of aluminium ;

4 marks

Total 14 marks

Question 3 **Maximum mark**

(a) Producer ;

Primary consumer /herbivore ;

2 marks

(b) (i) [Allow marking points if describe chondrus in B & C & Enteromorphia in B & C]

Rock pool B had {40-45%} *Chondrus* and no *Enteromorpha* ;

Rock pool C had {95-99%} *Enteromorpha* and no *Chondrus* ;

2 marks

(ii) 1. In Rock pool A, *Enteromorpha* remains {low / none little change} ;

2. But in Rock pool B it increases {after 4 months/ between 4 and 10 months} and then levels off ;

3. In Rock pool C it falls {after / from} 2 months (through the rest of the period) ;

3 marks

(iii) In Rock pool A the periwinkles eat all of the *Enteromorpha* ;

In Rock pool B the removal of the periwinkles has removed the grazing, so the *Enteromorpha* can increase in cover / in Rock pool C the *Enteromorpha* has decreased because the periwinkles have been added to the rock pool ;

2 marks

(iv) (No *Enteromorph)* so periwinkles switch to eating *Chondrus*/ new consumer / ref to specified environmental change ;

1 mark

Question 3 continued **Maximum mark**

(c) 1. Maximum number of algal species at periwinkle density of 150 periwinkles per m^2 / Up to 150 periwinkles per m^2 the number of algal species increases and above 150 periwinkles per m^2 algal species decrease ;

2. Number of species increase because periwinkles are eating {particular species / Enteromorpha} / periwinkle grazing stops faster growing algae out competing other species ;

3. Number of species decrease because periwinkles eat all species / periwinkles eating algae faster than they can grow/inedible ones survive / faster growing ones survive ;

2 marks

(d) (i) 1. (Raw) sewage ;

2. Fertiliser(s) ;

3. Detergents(s) ;

2 marks

(ii) 1. (Excess nutrients) {stimulates / increases} {algae growth / eq} ;

2. Reference to eutrophication in correct context (as excess nutrients) ;

3. {Algae / plants} die ;

4. {Bacteria / decomposers} increase in number ;

5. {Bacteria / decomposers} use up oxygen / oxygen level falls / BOD increases ;

6. Death of {fish / other animals} ;

4 marks

Total 18 marks