

Mark Scheme (Results)

Summer 2007

GCE

GCE Biology SNAB (6134/01)

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 marks

(a) (i) prokaryotae/eq ;

1 mark

(ii)

Kingdom	Feature
protocista / protista	single celled;
fungi	mycelium / hyphae / <u>chitin</u> cell wall / heterotrophic nutrition ;
plantae	<u>cellulose</u> cell wall/{large/ permanent} vacuole /photosynthesis / autotrophic/ chloroplasts;
animalia	no cell wall or large vacuoles / heterotrophic;

(1 mark per correct 2 boxes)
(rows must match)

4 marks

(b) (i) B *Formica aquilonia*
D *Formica exsecta*
E *Formica sanguinea*

(2) marks for all three, lose one mark per error

(ii) *Formica* ;

1 mark

Total 8 marks

Question 2

Maximum mark

- (a) (i) BBhh - black, long hair ;
bbHH - white, short hair ; 1 mark
- (ii) BbHh ; 1 mark
- (b) (i) BbHh x bbhh;
- | | |
|----|------|
| | bh |
| BH | BbHh |
| Bh | Bbhh |
| bH | bbHh |
| bh | bbhh |
- 1 for gametes correct ;
1 for offspring correct ;
1 for phenotypes: black short, black long, white short, white long ; 4 marks
- (ii) new combinations of characteristics/alleles ;
in offspring but not parents ;
example ; 2 marks
- (c) mutation produces new alleles/changes DNA /eq ;
independent assortment mixes alleles/ new combinations of alleles ; 2 marks
- (d) provides new alleles / new combinations of alleles / keeps large gene pool ;
allows adaptations / allows natural selection /allows response to changes in
environment / reduces inbreeding / avoids homozygosity and consequent problems ; 2 marks
- Total 12 marks**

Question 3

Maximum mark

- (a) (i) A stroma
B starch (grain) / lipid droplet
C thylakoid (membrane) / chlorophyll
D granum

(2) for all correct
(1) for 2 or 3 correct

2 marks

- (ii) C / thylakoid / granum / D ;

1 mark

- (iii) photolysis/splitting water using light energy ;
release of electrons to chlorophyll ;
releases hydrogen ions ;
oxygen released ;
OH source of oxygen ;

3 marks

- (b) reduced production (of carbohydrate) ;
less carbon dioxide fixed ;
ref RuBP ;
ref Calvin cycle / eq ;
less carbon available for reduction to carbohydrate ;
ref to enzyme / RuBPCarboxylase ;

3 marks

- (c) high light intensity ;
ref. to change in wavelength ;
high temperature ;
high humidity ;
high carbon dioxide concentration ;

2 marks

Total 11 marks

Question 4

Maximum mark

- (a) (i) GPP and NPP similar to start with ;
both increase ;
(After 2 days) GPP and NPP diverge/eq ;
figures in support ;

2 marks

- (ii) more energy is used in metabolism/eq in {older / bigger} plants ;
figures in support ;
suitable explanation e.g. protein synthesis/flower initiation/differentiation /
ref. to herbivores ;
more photosynthesis tissue ;
(as grows) / eq ;

2 marks

- (b) $GPP - NPP = R$ /eq ;
biomass production reduced by respiration / eq ;

2 marks

Total 6 marks

Question 5

Maximum mark

(a) present inside {cells/ macrophages} ;

1 mark

(b) B-cells :
antibody production ;
ref memory cells ;
ref plasma cells ;
T-cells :
antigenic presentation ;
stimulation of B-cell proliferation / eq ;

3 marks

(c) (i) HIV destroys T (helper) cells ;
Bacterial cells not destroyed by the immune system / eq ;
Bacteria proliferate/eq ;

2 marks

(ii) tubercles ;
fever ;
excessive coughing / coughing blood ;
weight loss ;

2 marks

Total 8 marks

Question 6**Maximum mark**

- (a) changed body temperature ;
(detected by) thermo-regulatory centre/hypothalamus ;
ref. to thermoreceptors /eq ;
causes changed heat production/changed heat loss ;
example heat loss mechanism ;
example heat gain mechanism ;
return to normal temp ;
regulatory mechanisms switched off/eq ;

5 marks

- (b) raised set point ;
ref. chemical secretions ;
in hypothalamus ;
increased body temp/fever ;
loss of control if too high/positive feedback ;

2 marks**Total 7 marks**

Question 7

Maximum mark

- (a) proportion of total alleles ;
for one gene (in a population)/eq ;

2 marks

- (b) different alleles exist / ref mutation ;
advantage in specific environment ;
ref selection pressure ;
more likely to reproduce ;
allele passed to offspring more often ;
ref at disadvantage in other environment ;

Allow converse argument

4 marks

- (c) faster life cycle of bacteria/converse/ eq ;
greater selection pressures on bacteria (eg antibiotic use) ;
ref plasmid transfer in bacteria/eq ;
larger numbers of bacteria hence larger gene pool/eq ;
ref. mutation ;

2 marks

Total 8 marks

PAPER TOTAL 60 MARKS