

# Mark Scheme (Results) Summer 2007

GCE O

GCE O Biology (7040/02)

## 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.

## BIOLOGY 7040/02 MARK SCHEME

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### Symbols used in mark points

- ; indicates separate mark points  
/ indicates alternatives  
eq means allow any correct equivalent

### Paper 2

#### Section A

1. (a) ATP / glycogen; (1)
- (b) aerobic respiration; (1)
- (c) lost / used / eq;  
as heat; max  
used in overcoming / due to friction / eq; (2)
- (d) (build up of) lactic acid produced;  
causes cramp / painful;  
is toxic / poisonous / harmful / dangerous / eq; max  
oxygen debt; (2)
- (e) short duration / eq;  
anaerobic; max  
energy from stored ATP; (2)
- (f) none / very little / less / 10% or lower;  
aerobic;  
oxygen;  
long duration / less speed / slower race; max  
build up of oxygen debt / lactic acid too great; (2)
- (g) gain more oxygen / eq;  
oxygen debt; max  
remove / oxidise / break down / convert / eq lactic acid; (2)
- (h) strong/ large / powerful heart / heart size / heart rate;  
lung volume / capacity;  
long legs / leg length;  
body mass /weight /eq;  
(high) RBC /haemoglobin / capillaries / blood volume; max  
tolerance to lactic acid; (2)

Total 14 marks

2. (a) chloride; (1)
- (b) magnesium;  
high(er) concentration (in pond);  
low(er) in plant cells;  
concentration / diffusion gradient; max (3)
- (c) chlorophyll; (1)
- (d) active transport / active uptake;  
against concentration gradient;  
respiration;  
aerobic; requires energy / ATP; max (3)
- (e) water; (1)
- (f) oxygen; for respiration;  
OR light; for photosynthesis;  
OR temperature; for enzyme action; (2)

Total 11 marks

3. (a) (i) scale linear + half or over of grid;  
IF non-linear - no points  
line clear + labelled (Hi and Lo);  
axes correct + labelled; (% plankton Time in hours)  
points correctly plotted;; (5)
- (ii) 12.5; (1)
- (iii) mussels at high water faster;  
less time (to feed / filter); (2)
- (b) (i) 4; (1)
- (ii) mussels, barnacles and limpets; (1)
- (iii) shape correct;  
names labelled;  
order of names correct; (3)

Total 13 marks

4. C: different concentration of carbon dioxide;  
O: same mass of plant / same age / species / eq;  
R: repeat;  
M: mass / height / eq;  
S: 1 for a stated time; 1 hour-1 week  
2 temperature / light intensity / eq;

Total 6 marks

5. (a) glucose;  
fats / fatty acids / glycerol; (2)
- (b) (i) 12; (1)
- (ii) sprayed with water / not sprayed / no repellent / no cream / eq; (1)
- (iii) number / species / age / eq of mosquitoes;  
temperature; (2)
- (iv) it works / good to use / eq;  
fewer bites / reduces bites / eq; (2)

Total 8 marks

6. (a) only some molecules / particles / substances in or out / pass  
through / eq;  
depending on size; (2)
- (b) (i) 10(%);;  
(1) for  $\frac{33-30}{30}$  or  $\frac{3}{30}$  (2)
- (ii) water in;  
high concentration to low concentration (of water) /  
dilute to conc. solution / eq; max  
osmosis; (2)
- (iii) line from 30;  
line going upwards; (2)

Total 8 marks

Section B

7. (a) plant shoot grows towards light/ positive;  
auxin;  
uneven growth / on dark side;  
geotropic / gravitropic;  
plant shoot grows away from gravity / negative;  
phototropic; max  
(4)
- (b) nervous is fast(er); allow converse slower  
nervous is electrical /impulse; chemical  
along specialised cells /neurones; blood  
direct to target cells/ specific; around body  
shorter term response; long term max  
all or nothing response; dose (4)

Total 8 marks

8. (a) (less) photosynthesis;  
(less) carbon dioxide absorbed;  
(more) carbon dioxide in atmosphere;  
less food / carbon available for animal species;  
less decomposition; IGNORE combustion max  
(4)
- (b) (less) transpiration / evaporation / water loss from leaves;  
(less) water uptake;  
less rainfall;  
increased runoff; max  
flooding; (4)

Total 8 marks

9. (a) temperature rises;  
denatures enzymes / eq;  
kills microorganisms; max  
less / different product; (3)
- (b) lack of mixing /eq;  
less oxygen available;  
less food available/eq;  
uneven temperature /eq;  
slows rate of aerobic respiration / makes conditions anaerobic;  
less / different products; max  
(3)
- (c) other / unwanted bacteria/ fungi / microorganism;  
competition for resources / food /nutrient / oxygen / eq;  
contamination of product; max  
less / different product; (2)

Total 8 marks

## Section C

10. breathing in / inhalation / inspiration;  
diaphragm;  
flattens / eq;  
intercostal muscles;  
contract; (once)  
ribs move upwards and outwards;  
volume increases;  
pressure decreases;
- alveoli / air sacs;  
large surface area;  
thin / single cell;  
moist;  
capillaries;  
red blood cells / haemoglobin;  
diffusion; max  
gradient maintained by flow of blood carrying oxygen away; (12)

Total 12 marks

11. **Protoctist / plasmodium;**  
malaria;  
transmitted by mosquito;  
controlled by killing insects vectors / draining ponds / drugs /eq;

**bacteria/ named organism;**  
cholera ;  
transmitted by water / food;  
controlled by immunisation / cooking food/ boiling water /eq;

**viruses/ named virus;**  
AIDS;  
transmitted by sexual contact / body fluid;  
controlled by avoiding sexual contact / having safe sex /eq;

**fungi /named fungus;**  
thrush /athlete's foot /eq;  
airborne spores / contact;  
avoid exposure to infected people;

antibiotics;  
kill bacteria;

vaccination / immunisation;  
protects against future exposure / prevents getting disease / eq;  
memory cells;  
antibody production faster and in greater quantity;

lymphocyte;  
antibody production;

phagocyte;  
engulf/ eq.;

max  
(12)

Total 12 marks



12. example of species farmed:  
salmon /trout / tuna/ bream / cod/ prawns / lobster / eq;

production of / caring for eggs;  
caged areas / nets;  
predator control;

oxygen level kept high / regulated;  
water cleaned / filtered/ replaced;  
waste / faeces / ammonia removed;  
preventing growth of bacteria / decomposers;  
reduce / prevent eutrophication;

intensive farming method;  
higher risk of disease ;  
use of antibiotics / fungicides / pesticides / biological control;  
selective breeding / genetic engineering;  
manipulation of sexes / all female;  
for faster growth / placid nature /eq;

high protein diet;  
fed regularly / small amounts;  
separation of ages / sizes;  
easier to catch fish/ drain ponds /lakes;

max  
(12)

Total 12 marks