

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

International General Certificate of Secondary Education

**MARK SCHEME for the June 2005 question paper**

**0610 BIOLOGY**

**0610/02**

**Paper 2 (Core Theory), maximum mark 80**

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

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**Grade thresholds** for Syllabus 0610 (Biology) in the June 2005 examination.

|             | maximum<br>mark<br>available | minimum mark required for grade: |    |    |    |
|-------------|------------------------------|----------------------------------|----|----|----|
|             |                              | A                                | C  | E  | F  |
| Component 2 | 80                           | N/A                              | 39 | 28 | 23 |

The threshold (minimum mark) for D is set halfway between those for Grades C and E.  
The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.



June 2005

IGCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0610/02

BIOLOGY  
Paper 2 (Core Theory)



| Page 1 | Mark Scheme       | Syllabus | Paper |
|--------|-------------------|----------|-------|
|        | IGCSE - June 2005 | 0610     | 2     |

- 1 (a) (i) 3 body regions/parts/head, thorax, abdomen; R - segments  
 3 pairs of/6 legs;  
 1 pair of antennae/'feelers';  
 wing (buds);  
 compound eye;  
 Any two - 1 mark each [2]

- (ii) gills;  
 waterproof exoskeleton/cuticle;  
 tails for swimming;  
 Any one - 1 mark [1]

(b)

| species                 | diagram letter |
|-------------------------|----------------|
| <i>Centropilum</i>      | A;             |
| <i>Ecdyonurus</i>       | E;             |
| <i>Ephemera</i>         | C;             |
| <i>Paraleptophlebia</i> | D;             |
| <i>Potomanthus</i>      | B;             |

First four correct responses - 1 mark each [4]

[Total: 7]

- 2 (a) (i) fresh mass contains water/dry mass does not contain any water; [1]  
 (ii) water content of plant can vary greatly;  
 water content affected by soil conditions/humidity of air/OWTTE; [1]  
 (iii) to eliminate reduce individual variation;  
 to improve reliability of results; I - refs. to average/mean/accuracy/exactness  
 Any one - 1 mark each [1]

- (b) (i) (fresh) mass rises;  
 values from graph (0.45 → 0.64)/rises by 40 - 50%/by 0.19; [2]  
 (ii) due to intake of water; [1]

- (c) (i) (dry) mass decreases/values from graph (0.45 → 0.24)/falls by 40 - 50%/by 0.21; [1]  
 (ii) breakdown of glucose/sugar/carbohydrate; I - starch  
 in respiration;  
 loss of carbon dioxide/gas/product of respiration;  
 Any two - 1 mark each [2]

| Page 2 | Mark Scheme       | Syllabus | Paper |
|--------|-------------------|----------|-------|
|        | IGCSE - June 2005 | 0610     | 2     |

- (d) hydration of cells/cytoplasm;  
reactants/chemicals into solution;
- enzymes become active;  
food reserves digested;
- respiration starts;  
uptake of minerals;
- leaves develop;  
chloroplasts/chlorophyll develops;  
photosynthesis starts;
- end products such as starch/cellulose etc. formed;  
mitosis occurs;

Any four - 1 mark each

[4]

[Total: 13]

- 3 (a) (i) adrenaline;

[1]

- (ii) causes increased heart rate/pulse rate/increased cardiac output;  
causes increased breathing rate;  
causes release of glucose/blood sugar;  
from storage/glycogen/liver/muscles;  
diverts more blood (from gut etc.) to muscles;

Any two - 1 mark each

[2]

- (b) (i) glucose → lactic acid/lactate;

[1]

- (ii) less energy released (per unit of glucose);  
lactic acid is toxic/needs to be destroyed/causes muscle cramp;

[2]

- (c) (i) 4;

[1]

- (ii)  $0.5 \text{ dm}^3/500 \text{ cm}^3$ ;

[1]

- (iii)  $4 \text{ (breaths)} \times 500 \text{ (cm}^3\text{)} \times 4 \text{ (quarter minutes)}$ ;  
 $8 \text{ dm}^3/8000 \text{ cm}^3$ ;

[2]

- (iv) single breaths occupy a shorter time;  
breaths have greater amplitude;

[2]

[Total: 12]

|               |                          |                 |              |
|---------------|--------------------------|-----------------|--------------|
| <b>Page 3</b> | <b>Mark Scheme</b>       | <b>Syllabus</b> | <b>Paper</b> |
|               | <b>IGCSE - June 2005</b> | <b>0610</b>     | <b>2</b>     |

- 4 (a) (i) if body temperature above normal/body gets hot;  
sweat released;  
contains water;  
evaporation occurs;  
reference to latent heat/OWTTE;  
body/blood temperature drops;

Any three - 1 mark each

[3]

- (ii) if body temperature below normal/body gets cold;  
arterioles (in skin) constrict/narrow;  
reduced flow of blood;  
to skin/subcutaneous capillaries;  
less loss of heat by radiation/convection;  
body temperature drops no further/OWTTE;

Any four - 1 mark each

[4]

- (b) enzyme activity temperature dependent/ref. to optimum temperature/  
example such as high temperatures denature enzymes/low temperatures  
slow enzyme activity;

allows constant metabolic rate/activity independent of temperature  
of environment;

[2]

[Total: 9]

- 5 (a)

| term          |
|---------------|
| dominant;     |
| allele;       |
| heterozygous; |
| genotype;     |

[4]

- (b) (i) white;

[1]

- (ii) (parent genotypes) Rr Rr  
(gametes) R r R r  
(offspring genotypes) RR Rr Rr rr;  
(phenotypes) red red red white;

link to values with ratio 3 red: 1 white/OWTTE;  
Mark Punnet's squares based on above points

Any four - 1 mark each

[4]

| Page 4 | Mark Scheme       | Syllabus | Paper |
|--------|-------------------|----------|-------|
|        | IGCSE - June 2005 | 0610     | 2     |

- (iii) all red/1 red to 0 white;  
1 (red):1(white)/50 - 50; [2]

[Total: 11]

- 6 (a) (i) sun/sunlight/light; [1]  
(ii) Adelie penguin; [1]

- (b) (killer whale)  
↑  
Leopard seal  
↑  
Adelie penguin  
↑  
krill  
↑  
algae; [1]

- (c) (Leopard seal)  
leopard seal population drops;  
because of smaller Adelie penguin population/less food/only 1 food source;  
(Ross seal)  
Ross seal population drops;  
because Leopard seal eats more Ross seal;

OR

Ross seal population rises;  
as less Adelie penguins then more krill available;  
thus rise in squid/Ross seal food;

OR

Ross seal population rises;  
as less predators (Leopard seals);

Any four - 1 mark each (in context of each prediction) [4]

[Total: 7]

- 7 (a) (i) allows/assist peristalsis;  
reduces constipation;  
reduces risk of colon cancer;  
Any two - 1 mark each [2]  
(ii) herbivore/primary consumer/2<sup>nd</sup> trophic level/decomposer; [1]  
(iii) chemical; [1]  
(iv) form cell walls; [1]

| Page 5 | Mark Scheme       | Syllabus | Paper |
|--------|-------------------|----------|-------|
|        | IGCSE - June 2005 | 0610     | 2     |

- (b) calcium;  
vitamin D;  
phosphate;  
fluoride;

Any two - 1 mark each

[2]

[Total: 7]

- 8 (a) (i) atrium clearly labelled; A - either wall or cavity

[1]

- (ii) pulmonary vein clearly labelled;

[1]

- (iii) cavity of right atrium and ventricle (Y) shaded;

[1]

- (b) (chamber) Z pumps blood further (than Y)/ORA;  
(Z) has more muscle (in wall)  
to contract with/generate greater pressure;

Any two - 1 mark each

[2]

- (c) coronary (vessel or artery);

[1]

- (d) stop smoking;  
reduce stress;  
reduce (animal) fat/cholesterol in diet;  
reduce salt intake;  
take regular exercise;

Any two - 1 mark each

[2]

[Total: 8]

- 9 (a) (i) X positioned correctly - steeply rising line in periods A and B;

[1]

- (ii) Z positioned correctly - level line in periods C or E;

[1]

- (b) food supply/availability limiting/decreases/insufficient;  
living/burrowing space/breeding sites inadequate/demand exceeded;  
death rate exceeds birth rate;  
disease/parasites;  
predators;  
emigration exceeds immigration;  
climate change/severe weather change;  
(Beware explanations that clearly apply to changes in human population,  
e.g. wars, rather than rabbit population)

Any four - 1 mark each

[4]

[Total: 6]