

**CAMBRIDGE**  
INTERNATIONAL EXAMINATIONS

**JUNE 2003**

**INTERNATIONAL GCSE**

**MARK SCHEME**

**MAXIMUM MARK: 40**

**SYLLABUS/COMPONENT: 0610/01**

**BIOLOGY**  
**Paper 1 (Multiple Choice)**



<b>Page 1</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>IGCSE EXAMINATIONS – JUNE 2003</b>	<b>0610</b>	<b>1</b>

<b>Question Number</b>	<b>Key</b>	<b>Question Number</b>	<b>Key</b>
1	<b>B</b>	21	<b>C</b>
2	<b>A</b>	22	<b>D</b>
3	<b>B</b>	23	<b>D</b>
4	<b>D</b>	24	<b>C</b>
5	<b>B</b>	25	<b>D</b>
6	<b>A</b>	26	<b>D</b>
7	<b>D</b>	27	<b>C</b>
8	<b>A</b>	28	<b>B</b>
9	<b>A</b>	29	<b>D</b>
10	<b>B</b>	30	<b>B</b>
11	<b>C</b>	31	<b>A</b>
12	<b>D</b>	32	<b>C</b>
13	<b>C</b>	33	<b>C</b>
14	<b>B</b>	34	<b>C</b>
15	<b>C</b>	35	<b>C</b>
16	<b>A</b>	36	<b>D</b>
17	<b>D</b>	37	<b>A</b>
18	<b>C</b>	38	<b>A</b>
19	<b>C</b>	39	<b>B</b>
20	<b>D</b>	40	<b>A</b>

**TOTAL 40**

**CAMBRIDGE**  
INTERNATIONAL EXAMINATIONS

**JUNE 2003**

**INTERNATIONAL GCSE**

**MARK SCHEME**

**MAXIMUM MARK: 70**

**SYLLABUS/COMPONENT: 0610/02**

**BIOLOGY**  
**Paper 2 (Core)**



<b>Page 1</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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**1 (a)** excretion;  
growth;  
movement; ignore - locomotion  
nutrition; ignore - feeding  
reproduction;  
sensitivity/irritability;  
Accept descriptions  
Any three – 1 mark each [3]

**(b)** put mud in muslin bag/equivalent – workable apparatus;  
suspend over limewater/calcium hydroxide solution/hydrogencarbonate/  
bicarbonate indicator;  
in sealed container;  
incubate/leave for 12+ hours;  
look for limewater to go cloudy/milky/white/hydrogen carbonate to go yellow;  
carbon dioxide released indicates respiration;  
reference to use of control;  
Apply pattern of mark scheme to alternative approaches  
e.g. release of heat from or use of oxygen for respiration.  
Credit annotated diagrams  
Any four – 1 mark each [4]

**Total [7]**

Page 2	Mark Scheme	Syllabus	Paper
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- 2 (a) (i) X – stigma/carpel;  
 Y – anther/stamen; [2]
- (ii) small/insignificant “petals”/flowers “open”;  
 do not prevent wind access to anthers/stigma/pollen;  
 stamens/anthers hang outside of flower/petals;  
 to release pollen into wind/air;  
 stigma feathery;  
 trap/filter pollen (from air);  
 stigma hangs outside flower/petals;  
 to catch pollen (in the wind);  
 Any feature plus explanation – 1 mark each [2]
- (iii) no smell/scent;  
 no bright colours of petals/flowers/coloured green;  
 no nectar/nectary;  
 inconspicuous shape/size of flower/petals;  
 dry/dusty pollen;  
 large quantities/smaller size pollen;  
 Also features listed in (ii) above but **not** given  
 in candidate’s response to (ii)  
 Any two – 1 mark each [2]
- (b) (i) southwest; [1]
- (ii) most fruit found to north and east; apply error carried forward [1]
- (iii) distribution of fruit on branches;  
 distribution of branches on tree;  
 animals feed on/collect fruits from one region around tree;  
 other valid biological suggestions; ignore - human intervention.  
 Any one – 1 mark [1]
- Total [9]**

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**3 (a) (i) C/(i) alongside a relevant arrow; [1]**

**(ii) D/(ii) alongside a relevant arrow; [1]**

**(iii) P/(iii) alongside a relevant arrow; [1]**

**(iv) R/(iv) alongside a relevant arrow; [1]**

If in any section more than one label is given all of that label must be correct

**(b) (i) less/no (trees/leaves) to photosynthesis;  
more carbon dioxide in air/less removed from air;  
no/less (leaves/wood) to decay;  
Any two – 1 mark each [2]**

**(ii) less (leaves to) transpire/evaporation of water/evapotranspiration;  
less roots/plants to absorb water (from deep layers);  
less water v/water vapour in air/less rainfall;  
Ignore - refs to floods/droughts/erosion/desertification.  
Any two – 1 mark each [2]**

**Total [8]**

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- 4 (a) (i) A** – nucleus/nuclear membrane;
- B** – cytoplasm; [2]
- (ii)** label **C** clearly linked to a cell membrane in each cell; [1]
- (b) (i)** has cilia (on one surface/end of cell); ignore - hair  
to move mucus; reject - trap bacteria/dust, etc. [2]
- Credit valid references to goblet cells and function of producing mucus
- (ii)** has haemoglobin/no nucleus/biconcave;  
transport oxygen; [2]
- (c) (i)** movement of molecules/particles/ions;  
down concentration gradient/from higher to lower concentration; [2]
- (ii)** movement of water (molecules);  
across/through partially/semi/differentially/selectively  
permeable membrane. [2]
- Total [11]**

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0610	2

5 (a) mitosis;  
diploid;  
meiosis;  
haploid;  
gametes; [5]

(b) use of correct symbols/**X** and **Y**;  
parent genotypes shown;  
gamete genotypes shown;  
offspring genotypes shown;  
phenotypes for both sexes identified.  
parent genotype wrong – max 3  
Any four – 1 mark each [4]

**Total [9]**



<b>Page 6</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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- 6 (a)** top left box to 2<sup>nd</sup> right box;  
2<sup>nd</sup> left box to top right box;  
bottom left box to bottom right box; [3]
- (b) (i)** label to colon/large intestine; [1]
- (ii)** label to liver; reject - gall bladder [1]
- (iii)** label to liver; [1]
- (iv)** label to pancreas; reject - small intestine. [1]
- Total [7]**

<b>Page 7</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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- 7 (a)**
- A** – refracts/bends light rays/lets light enter eye;  
ignore - protection
- B** – focuses light rays/image on to the retina/fovea;  
ignore - accommodation/change in shape
- C** – controls light entering (inner) eye/reaching retina/lens;  
ignore - change in pupil
- D** – changes light into/generates nerve/electrical impulses;  
ignore - signals unqualified/messages [4]
- (b)**
- more/too much light enters/reaches retina;  
dazzles person/causes blurred vision/damages retina;  
ignore - double vision. [2]
- Total [6]**

<b>Page 8</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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- 8 (a)** (translocation) is movement of soluble materials/sugars/amino acids;  
 from supply to demand/clearly identified example;  
 in phloem;  
 (transpiration) is diffusion/loss of water vapour/evaporation of water;  
 from leaves/through stomata to atmosphere;  
 down concentration gradient;

Any four – 1 mark each [4]

- (b)** leaves lose water;  
 water moves/passes/is drawn up/ref to transpiration stream;  
 up stem/leaf stalk;  
 through xylem/vessels;  
 (dye) dissolved/carried in water.

Any four – 1 mark each [4]

**Total [8]**

<b>Page 9</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>IGCSE EXAMINATIONS – JUNE 2003</b>	<b>0610</b>	<b>2</b>

- 9 (a) (i) light/sunlight (energy); ignore - solar [1]
- (ii) chemical (energy); ignore - potential [1]
- (b) (i) bacteria/fungi; ignore - decomposers/saprophytes [1]
- (ii) heat/thermal (energy); [1]
- (c) energy is not passed back to the sun/grass/producer/  
not recycled/OWTTE. [1]
- Total [5]**

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**MARK SCHEME**

**MAXIMUM MARK: 70**

**SYLLABUS/COMPONENT: 0610/03**

**BIOLOGY**  
**Paper 3 (Extended)**

Page 1	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0610	3

1 (a) one mark for each part (drawn) and labelled correctly:

renal artery;

urethra;

ureter;

one mark for quality of drawing;

MAX. 2 FOR LABELLING "STUMPS" ONLY

4

(b)

water;

urea; Allow nitrogenous waste

uric acid;

salts or minerals or named salts; Allow vitamins

hormones;

Reject 'waste products unqual./ions unqual.'

max. 3

(c)

i. ref. to blood enters machine from patient AW;  
(ONLY CREDIT ONCE)

ii. ref. to pump;

iii. blood passes along + dialysis tubing AW/visking tubing/cellulose  
or cellophane tubing;

iv. ref. to tubing AW being semi-permeable/selectively permeable/  
acting as a filter AW;

v. ref. to surrounding liquid;

vi. containing + some salts/glucose/no urea;

vii. ref. to fluid has same O. P. as blood;

viii. waste materials/excess materials + pass from blood;

ix. ref. to diffusion;

x. ref. to bubble trap/counter flow;

x. 'cleaned' blood returns + to patient's circulation/body AW;  
(ONLY CREDIT ONCE)

max. 4

(d)

(i) ref. to internal environment;  
maintained (at constant level)/regulated/balanced;

2

(ii) ref. to maintaining level of named substance in blood;  
method outlined, e.g. filtration/reabsorption/osmosis/diffusion;

2

(iii) suitable organ named;  
named substance levels maintained;  
ref. to mechanism for maintaining constant level;

3

max 18

Page 2	Mark Scheme	Syllabus	Paper
	IGCSE EXAMINATIONS – JUNE 2003	0610	3

- 2 (a) one mark for each column drawn and shaded correctly; 2
- (b) (i) 12 (%); 1
- (ii) AWARD 2 MARKS FOR CORRECT ANSWER, EVEN WITHOUT WORKING  
 $50 + 12 + 13 + 6 + 7;$   
 $= 88 (%);$  2
- (c) **REJECT REF. TO FLUORINE ONCE in (i), (ii) or (iii)**
- (i) fluoride (in water) reduces (the number of) decayed teeth in children; 1
- (ii) add fluoride to the drinking water in town B;  
advise children to use fluoride toothpaste;  
use other suitable, named, source of fluoride; max 1
- (iii) i. ref. to side effects of too much fluoride, e.g. browning of tooth enamel or possible cancer risk;  
ii. ref. to importance of personal choice/makes water impure;  
iii. ref. to allergies to fluoride;  
iv. ref. to cost of fluoridation;  
v. ref. to treatment of whole population when not all benefit;
- Reject refs. to fluoride flavouring water/refs. to being bad for health/has side effects unqual. max 1
- max 8**

Page 3	Mark Scheme	Syllabus	Paper
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- 3 (a) involves giving the organism two names;  
ref. to genus and species; 2
- (b) (i) *Caulerpa* grows at twice their rate AW;  
ref. to competition (for light/CO<sub>2</sub>/space for attachment/other plausible factor AW); Reject refs. to O<sub>2</sub> 2
- (ii) ref. to primary consumer/(organism) that feeds on plants/producers; 1
- (iii) ref. to disease/predation or shortage of + food/herbivores/sea urchins;  
resulting in death/migration AW; 2
- (c) ref. to chlorine being + dangerous/poisonous/damaging to other organisms/a pollutant; 1
- (d) (i) i. ref. to possible effects on local food chains or food webs AW;  
ii. ref. to destabilization of the ecosystem;  
iii. ref. to extinction (of other organisms);  
iv. ref. to local fishing industry;  
v. ref. to importance of conservation;  
vi. ref. to possible use of local species for medicines;  
vii. ref. to effects on biodiversity; max 2
- (ii) ref. to its ability to feed on *Caulerpa*; Reject ref. to pest unqual.  
reduces competition between *Caulerpa* and local seaweeds;  
reduces population of *Caulerpa*;  
allows other species to grow again; max 2
- (iii) i. it may eat other seaweeds as well;  
ii. causing their extinction AW;  
iii. ref. to no natural predators of the sea slug present AW;  
iv. ref. to unbalancing + food chains/webs/ecosystem;  
v. ref. to introduction of disease; max 2
- max 14**



<b>Page 4</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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- 4 (a) (i) (SIMILARITIES)**
- i. ref. to exoskeleton;
  - ii. ref. to jointed limbs AW;
  - iii. no backbone/ref. to invertebrate;
  - iv. both have segmented body;
  - v. both members of the arthropod group;
- Accept ref. to stages of development, e.g. ecdysis/instars **max 3**

- (ii) (DIFFERENCES)**
- 1 MARK FOR TABLE, MAX. 4 FOR DIFFERENCES**
- i. table format with suitable headings;
  - ii. insects have 3 pairs of legs + arachnids have 4 pairs;
  - iii. insects have wings + arachnids do not; Allow refs to ability to fly
  - iv. insects have antennae + arachnids do not;
  - v. insects have compound eyes + arachnids do not/ref. to simple eyes;
  - vi. insects have 3 parts to the body + arachnids have 2 parts;
  - vii. arachnids have chelicerae/pincer-like jaws + insects do not;
  - viii. arachnids spin webs + insects do not; Allow insects can be social + arachnids are not AW;
- max 5**

- (b)**
- i. named insect;
  - ii. ref. to variation AW;
  - iii. due to sexual reproduction/mating;
  - iv. ref. to mutation;
  - v. variation/mutation + leads to differential survival AW;
  - vi. suggestion for environmental change, e.g. temperature, food available;
  - vii. suggested change to insect, e.g. thicker cuticle, larger wings;
  - viii. ref. to benefit of change to the organism;
  - ix. ref. to survival of fittest/natural selection;
  - x. favoured genes passed on to next generation AW;
- max 7**

**max 15**

Page 5	Mark Scheme	Syllabus	Paper
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- 5 (a) ACCEPT OTHER PLAUSIBLE ANSWERS**
- i. ref. to unsuitable climate/temperature/rainfall/ref. to pollution;
  - ii. ref. to natural disasters, e.g. flooding/drought;
  - iii. water used for other purposes/diversion of rivers/building dams/poor irrigation;
  - iv. so plants are killed/poor germination/no food for animals; (linked to i. or ii. or iii.)
  - v. next year's seeds eaten through need for food;
  - vi. poor soil/lack of inorganic ions or fertiliser;
  - vii. so plants do not grow well; (linked to vi.)
  - viii. ref. to desertification/poor or thin soil;
  - ix. due to + deforestation/slash and burn; (linked to viii.)
  - x. ref. to lack of money + to buy seeds/fertiliser/pesticides/machinery/import food;
  - xi. ref. to war/farm redistribution;
  - xii. so there is no-one to harvest crops/too dangerous to tend crops/no experienced farmers AW; (linked to xi.)
  - xiii. ref. to urbanisation AW;
  - xiv. so there are fewer people to work the land/less land to grow crops on; (linked to xiii.)
  - xv. ref. to increasing population requiring food;
  - xvi. ref. to growth of + cash crops/monoculture/food for export (not suitable for local diet);
  - xvii. ref. to selling of food reserves to + settle national debt/maintain economy;
  - xviii. ref. to pest damage/disease (in crops or stored food);
  - xix. heat causes fresh produce to rot quickly AW;
  - xx. lack of suitable land to farm/ref. to overgrazing;
  - xxi. farmers poorly educated;
  - xxii. forests destroyed + so nothing to hunt/no food to collect;
  - xxiii. ref. to outmoded farm practices;
  - xxiv. ref. to poor transport/distribution;
- max 10**
- (b)**
- i. ref. to auxin;
  - ii. sprayed onto e.g. tomato flowers to induce fruit production;
  - iii. happens even if pollination has not occurred;
  - iv. ref. to use of auxins in + weedkiller/herbicide;
  - v. so crops have less competition;
  - vi. ref. to effect (only) on broad leaved plants (so monocot crops unaffected);
  - vii. ref. to use of hormones (e.g. cytokinin) in tissue culture;
  - viii. to promote root and shoot formation/form a callus;
  - ix. ref. to BST (bovine somatotropin);
  - x. used with cattle to increase milk production (linked to ix)
  - xi. ref. to growth hormone/testosterone;
  - xii. used to increase meat production;
  - xiii. ref. to production of seedless fruit;
  - xiv. ref. to promotion of seed germination;
  - xv. ref. to production of short plants (to resist wind damage);
  - xvi. ref. to delaying fruit production/ripening;
  - xvii. ref. to increasing fruit yield AW;
- max 5**

**max 15**

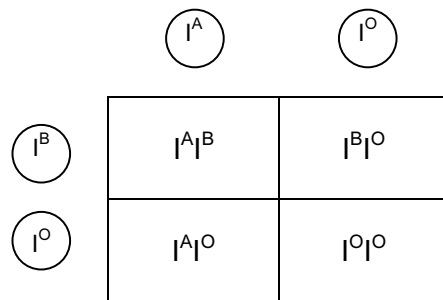
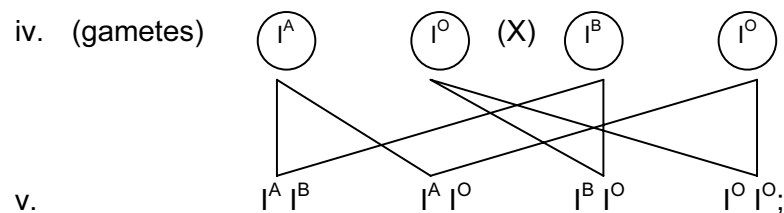
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- 6 (a) i. ref. to a pair of alleles; Reject gene ref. once  
 ii. in which one is not dominant over the other AW;  
 Reject both dominant; Allow both equally dominant  
 iii. so both alleles have an effect in phenotype/heterozygous organism AW;

3

(b) ACCEPT PUNNETT SQUARE  
 IF LINES ARE USED TO LINK GAMETES AND F1, THEY **MUST** BE CORRECT

- i. mother =  $I^A I^O$ ; Allow AO,  $I^A i$   
 ii. father =  $I^B I^O$ ;  
 iii. (parents)  $I^A I^O$  X  $I^B I^O$ ;



- vi.  $I^O I^O$  = baby with blood group;

6

- (c) (i) i. blood may + clump/clot/coagulate/agglutinate;  
 ii. due to presence of antigens on (the surface of) blood cells;  
 iii. and different antibodies present in other blood AW;  
 iv. ref. to no clumping if donor blood group is group O; **max 3**
- (ii) i. placenta keeps the blood of mother and fetus separate AW;  
 ii. since the blood types could be different AW;  
 iii. but allows exchange of materials between mother and fetus AW;

3

**max 15**

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**7 (a) MARK FIRST FIVE PARTS AND FUNCTIONS GIVEN ANY FIVE FROM:**

- i. penis + to insert sperm/semen + into vagina AW/ref. to erectile tissue;
- ii. urethra + to pass sperm/semen + through penis;  
Allow ref. to penis/ urethra + urine once;
- iii. testis + to make sperm/testosterone;
- iv. vas deferens/sperm duct + pass sperm from testis to urethra;
- v. epididymis + to store/mature/move + sperm;
- vi. scrotum + contain testes/to keep testes at lower temperature than that of body AW;
- vii. prostate gland/seminal vesicles/cowper's gland + to produce seminal fluid AW;

**5**

- (b) (i)**
- i. ref. to swimming;
  - ii. using tail;
  - iii. ref. to passing through cervix;
  - iv. ref. to passing through uterus/womb;
  - v. enter an oviduct/fallopian tube;
  - vi. ref. to chemical sensor AW;
  - vii. ref. to mitochondria + energy;

**max 4**

- (ii)**
- i. ref. to zona pellucida;
  - ii. sperm penetrates egg membrane;
  - iii. ref. to use of enzymes/acrosome;
  - iv. head of sperm enters egg;
  - v. sperm nucleus and egg nucleus fuse;
  - vi. ref. to formation of zygote;

**max 3**

- (c)**
- i. ref. to use of condom/femidom (during sexual intercourse);
  - ii. ref. to abstinence from sexual intercourse;
  - iii. ref. to screening of blood for transfusions/blood checked for HIV;
  - iv. ref. to use of sterile needles (for injecting drugs)/don't share needles;  
Reject refs to clean needles;
  - v. ref. to maintaining one partner/not sleeping around;
  - vi. ref. to health education;
  - vii. avoiding contact with blood + example;

**max 3**

**max 15**

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**MARK SCHEME**

**MAXIMUM MARK: 40**

**SYLLABUS/COMPONENT: 0610/05**

**BIOLOGY  
(Practical)**



Page 1	Mark Scheme	Syllabus	Paper
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- 1 (a)** \* lose if **no table**;
- \* use of ruled lines for columns and rows;
- \* time (table heading);
- \* height/level/measurement (table heading);
- record of units mm/cm and min/(A) clock times;
- readings taken at 5 min intervals;
- records for both sets of dough S1 and S2;
- manipulation of data/recording increase or differences;
- max 5**
- (b)** \* *lose if bar chart*
- orientation of axes; (time horizontal, height vertical)
- labels for axes including units; **(A) clock times**
- plotting data using suitable scale; **c. half the paper min.**
- \* plotting data for S1 (points visible, no obvious error, not (0,0));
- \* plotting data for S2 (points visible, no obvious error, not (0,0));
- \* clear lines;
- each curve identified/use of key;
- max 6**
- (c)** curve for S1 rises (with time);
- comment on rate of increase; **suitable qualification**
- curve for S2 does not rise;
- Look at candidate's graph. If not as expected, apply scheme as S1 trend, S2 trend and suitable comment on rate of increase**

**3**

<b>Page 2</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
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- (d) yeast is, living organism/fungus;  
 respiration;  
 without oxygen/anaerobic/fermentation;  
 sugar source of, food/nutrition/energy/substrate;  
 equation (for anaerobic respiration);  
 carbon dioxide evolved;  
 trapped/bubbles (remain in dough);  
 causes dough to rise;  
 rise stops as sugar runs out;  
 rise stops as yeast killed by alcohol;  
 dough sinks and valid explanation.

**max 6**

**Total: 20**

- 2 (a) (i) purple/mauve/lilac; **reject precipitate/dark purple**  
 (protein) present;

**2**

- (ii) add, sodium/potassium, hydroxide (solution);  
 then (a few drops) copper sulphate (solution);

**2**

- (b) (i) Drawing – clear outline S4;  
 at least 5 cm in one direction;  
 main shell (if present)/pattern on dorsal surface (if shell absent);  
 foot/other soft parts, shown;  
**use label to help you identify presence of soft parts if drawing unclear or if snail in shell**

Page 3	Mark Scheme	Syllabus	Paper
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Labels – shell/dorsal surface pattern; **reject exoskeleton alone**  
any soft part; **(A) soft body reject eyes alone**

6

- (ii) length of drawing measured correctly ( $\pm 2$  mm);  
correct calculation of "drawing length  $\div$  specimen length"; **(1 d.p.)**  
**ratio needs to be labelled**

2

- (c) *Candidates may use snails "as they are" in this beaker or remove some/all of them. Apply scheme to any sensible plan.*

use, thermometer/temperature probe;

place thermometer in contact with soft part of snail to record body temp.;

record temp. of surrounding air; **(A) area reject earth**

repeats; **(A) several snails**

investigate at different temps.;

leave snails to adjust to surroundings before measuring; **(A) time ref.**

idea of fair test; (e.g. same procedure when investigating at different temps.; leave same time interval between measurements; use same number of snails; other detail of fair test) **reject control**

max 3

- (d) (i) hard/rigid;  
colour/pattern;  
contrast between inside and outside;  
shape; **(A) like ....**  
hollow;  
opening;  
texture; **(A) smooth qualified**  
dimensions;

max 2



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(ii) effervescence/fizzing/AW;

shell is made of calcium carbonate;

**2**

(iii) support/protection ((**A**) *shelter*)/camouflage/muscle attachment;

**1**

**Total: 20**



**CAMBRIDGE**  
INTERNATIONAL EXAMINATIONS

**JUNE 2003**

**INTERNATIONAL GCSE**

**MARK SCHEME**

**MAXIMUM MARK: 40**

**SYLLABUS/COMPONENT: 0610/06**

**BIOLOGY**  
**(Alternative to Practical)**



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1 (a) Two from:

temperature or warmth or heat/[same type of] [amount of] yeast/type of flour/same size measuring cylinder/same mass or weight of dough/[same quantity of] [type of] sugar [2]

(ignore water [in q], amount of ingredients, pH, light, carbon dioxide, time, humidity, reading at eye level, cold)

(b) (i) Graph:

**O** orientation of axes and label of axes plus units;

**S** use of appropriate and even scale to fill half of the grid;

**P** plotting data A; B; C;

**K** key for separate date; max [5]

(ii) Line A - rises steadily;

Line B - does not rise/rises slightly/at a constant level;

Line C - rises and flattens; [2 stages] [3]

(iii) 80; [1]

(iv) Two from:

1. comment on **volume difference**, A more;

2. A has yeast [and B has none];

3. correct ref. to production of carbon dioxide; [2]

(v) Two from:

1. comment on **rate difference**/speeding up/faster;

2. substance X present in C [A has no X];

3. reasonable suggestion for role of substance X;

(accept enzyme, catalyst, improver, AW) [2]

**Total 15**

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**2 (a)** 2 conditions = 1 mark. No ½ marks.

warmth [correct/suitable temperature/10 to 30°C if specified];

oxygen;

but apply **ecf** for part **(b)**

[1]

**(b) Three from:**

**1.** identification of **one** workable condition **from (a)** for investigation - two sets one **with** and one **without**;

**2.** idea of sample size many seeds, a few seeds must be more than one seed for repetition idea;

**3.** some common factor of treatment between the two sets [with and without the condition] under investigation;  
(equal watering, equal number of seeds, same species AW)

**4.** left to grow for same time period;

(if stated minimum 1 + days, accept up to 3 weeks)

max [3]

**Total 4**

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**3 (a) (i) Drawing:**

clear outline;

correct proportions;

**Labels – 2 from:**

Tentacles;

eye [to be located at the end of the larger tentacles];

foot [qualified];

shell [dorsal/visceral shell or hump];

unsegmented body;

(ignore reference to negative features) [4]

**(ii) Magnification:**

Check measurements given are those transcribed into the formula -  
drawing size;  
 actual size

calculation is correct stated as ....x 1+  
 (this must be more than 1 if drawings is as large as fig 3.1) max [2]

**(iii) Similarity – one from:**

both have tentacles/eyes/same head/shell;

**Difference – one from:**

A has no large external shell and B has/shell has different  
 shape or comment on shape; AW [2]

**(iv) mollusc:** [1]

**Total: 9**

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- 4 (a) (i)** introduce a glowing splint/spill  
(do not award for match will burn/candles lighting/splints that are already burning)
- addition of pyrogallol; [1]
- (ii)** photosynthesis; [1]
- (iii)** 10 cm<sup>3</sup>;  
10 ÷ 5 = 2cm<sup>3</sup>; [2]
- (iv) Two from**, for design of experiment:
- method for setting up different light intensities;  
(bright light in introduction - so maybe dimmer or less light but must have detail of how this is to be achieved/distances away from light bulb/AW)
  - describe how to control a factor that may alter rate over a certain time  
(temperature - heat shield, carbon dioxide by adding hydrogen carbonate/AW)
  - additional feature of design –  
(same time period for comparison of results/eliminate background light, carry out investigation in a darkened room/replicates/ repetition/same piece of pondweed/recovery time between sets of measurements AW) max [2]

**(b)**

	<b>Colour</b>	<b>Explanation</b>
<b>(i)</b>	purple [1]	carbon dioxide used up/ photosynthesis [1]
<b>(ii)</b>	red/orange [1]	balance [between photosynthesis and respiration] [1]
<b>(iii)</b>	yellow [1]	respiration of 3 water shrimps/ produce carbon dioxide [1]

**Total: 12**

**Grade thresholds** taken for Syllabus 0610 (Biology) in the June 2003 examination.

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 1	40	-	29	24	20
Component 2	70	-	37	25	19
Component 3	70	48	33	-	-
Component 5	40	35	29	22	20
Component 6	40	32	24	18	15

The threshold (minimum mark) for B is set halfway between those for Grades A and C.

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.

Grade A\* does not exist at the level of an individual component.