

As part of CIE's continual commitment to maintaining best practice in assessment, CIE has begun to use different variants of some question papers for our most popular assessments with extremely large and widespread candidature. The question papers are closely related and the relationships between them have been thoroughly established using our assessment expertise. All versions of the paper give assessment of equal standard.

The content assessed by the examination papers and the type of questions are unchanged.

This change means that for this component there are now two variant Question Papers, Mark Schemes and Principal Examiner's Reports where previously there was only one. For any individual country, it is intended that only one variant is used. This document contains both variants which will give all Centres access to even more past examination material than is usually the case.

The diagram shows the relationship between the Question Papers, Mark Schemes and Principal Examiner's Reports.

Question Paper	Mark Scheme	Principal Examiner's Report
Introduction	Introduction	Introduction
First variant Question Paper	First variant Mark Scheme	First variant Principal Examiner's Report
Second variant Question Paper	Second variant Mark Scheme	Second variant Principal Examiner's Report

Who can I contact for further information on these changes?

Please direct any questions about this to CIE's Customer Services team at: international@cie.org.uk

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2008 question paper

0610 BIOLOGY

0610/31

Paper 31 (Extended Theory), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

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.

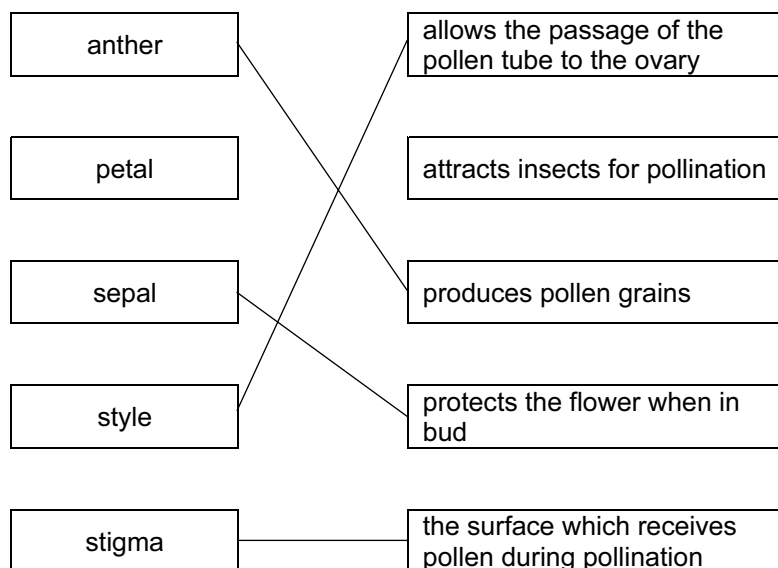
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CIE is publishing the mark schemes for the May/June 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.



Page 2	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	31

- 1 (a) *reject lines to or from the same box, e.g. anther and petal to produce pollen grains*
A if lines do not touch box but meaning is clear



[4]

- (b) *assume answer is about stigma of wind-pollinated flower unless told otherwise, accept ora, 2 max for differences, 1 or 2 for significance*

wind-pollinated stigma,

insect-pollinated stigma

feathery / hairy ; **R** branched
ignore not sticky
 large(r) ; **A** large surface area
 outside flower / AW ;
A pendulous / exposed
ignore long and short

not, feathery / hairy ;
ignore sticky
 small(er) ; **A** small surface area
 inside flower / AW ;

[2 max]

explanation

to catch pollen / AW (in the wind) ; **A** for pollen to attach (to stigma)
 or make pollination more likely / easier
 increase chance of pollination ;

'more likely to catch pollen' = 2 marks

[max 3]

- (c) 1 little / less / AW / no, variation ; **R** cloning
 2 ref to becoming homozygous ; *ignore ref to gene*
 3 e.g. of consequence 'good' or 'bad' ;
 e.g. less chance of adapting to changing conditions / less ability to evolve /
 may become extinct / adapted variety spreads / AW ;
 4 greater chance of pollination / ensures pollination occurs ;
 A reproduction / fertilisation
 5 useful if no other plants (of same species) nearby ;
 6 less wastage of pollen ; **A** gametes
 7 not dependent on (named) agent of pollination ;

[max 3]

[Total: 10]

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	31

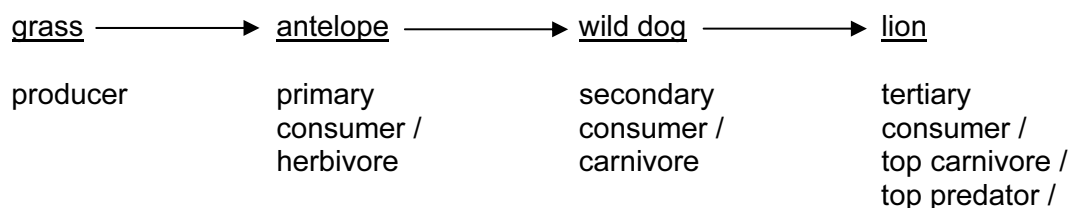
2 (a) (i) eats / consumes / feeds on, animals / meat / flesh ; [1]

(ii) fur / hair / whiskers / vibrissae ;
 external ear(s) / pinna(e) ;
 mammary glands / breasts / nipple / glands that produce milk / AW ;
R milk unqualified by external structure [max 1]

(b) (i) disease / parasite(s) / (named) pathogen(s) ;
 hunting (by farmers) ; **R** poaching
 shortage of, food / antelopes ; **A** idea of fewer
 shortage of water / drought ;
 predation (by lions) ; **A** more lions
 loss of habitat / AW e.g. territory ; **R** space unqualified
 change of climate / AW ;
 pollution ;
 AVP ; e.g. shortage of mates / small populations do not breed as much
R competition unqualified [max 2]

(ii) extinction / become endangered / become rare / inbreeding ; [1]

(c)



1 mark for minimum of two arrows in correct direction ;
 1 mark for all organisms named and all in correct order as a chain ;
ignore sun / decomposers / parasites
 2 marks for labelling the trophic levels –
either producer, primary, secondary + tertiary consumer
or 1st, 2nd, 3rd, 4th ;;
if one or two labels incorrect award 1 mark

[4]

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	31

- (d) (i) maintenance / protection / preservation / 'caring for' / 'looking after',
of, habitat / ecosystem / community / species / (named) organisms / resources;

'making a habitat' = 1 mark

One of the following for a max 1 mark

for future generations / prevent extinction ;
encourage breeding (in wild or in captivity) ;
ref to, biodiversity / genetic resources / AW ;

[max 2]

- (ii) prevent destruction of, grassland / habitat ; **A** preserve
(nature) reserve / wild life park / AW ;
rangers / wardens ;
ensure good supply of, food / antelopes / prey / AW ;
legislation / AW ; e.g. refs to poaching / wild life trade
control of, predators / lions ;
A 'kill lions' / 'drive lions away' / 'provide food for lions'
education of local population ;
captive *breeding* / *breed* in a zoo / *breeding* programme ;
reintroduction to the wild ;
AVP ; e.g. further detail of any of the above points

[max 3]

- (e) *ignore refs to nitrogen fixation / denitrification*
marking points 7 + 8 must be in the correct context

- 1 (eaten / digested by) (named) scavenger(s) / hyaenas / vultures ;
- 2 excretion / urine / egestion / faeces / AW ;
- 3 dung beetles / detritivores / maggots ;
- 4 decay / decomposition / rotting, by, bacteria / fungi / named decomposer ;
- 5 protein → amino acids ;
- 6 deamination / amino acids → ammonia ; } **A** protein → ammonia
- 7 ammonia → nitrite ; }
- 8 nitrite → nitrate ; } **A** ammonia → nitrate
- 9 nitrification / nitrifying bacteria ;
- 10 *Nitrosomonas* / *Nitrobacter* in correct context of nitrification ;
- 11 plants absorb, nitrate / ammonia ;

'decomposition by nitrifying bacteria' = 0

[max 5]

[Total: 19]

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	31

3 (a) (i) excretion ; [1]

- (ii) biological ; **A** made by, cells / organisms
catalyst / described ;
(made of) protein / AW ;

bio-catalyst = 2 marks [max 2]

(b) (i) pH ; **A** ph / PH / Ph [1]

- (ii) temperature ; **R** heat *ignore* room
size / mass / quantity / amount / surface area / type, of potato ;

volume of hydrogen peroxide ;
concentration of hydrogen peroxide ;

A 'amount' with respect to hydrogen peroxide
R refs to catalase / enzyme

[max 2]

- (c) *award two marks if correct answer (0.56 / 0.57 / 0.58) is given – may be in white space below the table*
if no answer or incorrect answer award one mark for correct working
if 0.5 or 0.6 award one mark

10 divided by 17.4

0.56 / 0.57 / 0.58 ;; [2]

(d) *graph*

- 1 *x-axis labelled* pH ;
- 2 *y-axis labelled – must have units*
rate (of oxygen production / of reaction), $\text{cm}^3 \text{ min}^{-1}$ / $\text{cm}^3 \text{ per min}$;
- 3 points all correct ; use the overlay, but **A** *ecf from (c)*
- 4 continuous and clear line , which may be either a curve which may not go through all the points or straight lines between points
R if line goes beyond plotted points

[4]

- (e) (i) increase in rate to (pH) 6 then decrease / reaches a peak at (pH) 6 ;
any rate given as a data quote, **with** $\text{cm}^3 \text{ min}^{-1}$ / $\text{cm}^3 \text{ per min}$;

[2]

- (ii) pH 6 is, optimum / when enzyme 'works best' ;

following points may refer to optimum or sub-optimum

ref to shape of enzyme ;

ref to active site ;

ref to denaturation ; **A** destroyed **R** 'killed'

ref to substrate / hydrogen peroxide, fitting into, enzyme / active site ;

[max 3]

[Total: 17]

Page 6	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	31

- 4 (a) try to mate them together, failure = suggests different species ;
mate together, no offspring = suggests different species ;
breed together and see if any offspring are, sterile / infertile ;
test DNA / examine chromosomes ; [max 1]
- (b) (i) continuous ; **A** discrete [1]
- (ii) *Equus grevyi* ; **A** *grevyi* [1]
- (c) (i) phenotype ; **A** close phonetic spellings [1]
- (ii) *these two points are linked – ‘change’ unqualified does not get a mark, but ‘change in DNA’ gets 2 marks*
change / AW ; e.g. substitution / deletion / error in meiosis
in, DNA / gene(s) / chromosome(s) ;
change in genotype / ‘genetic, structure / genetic make-up’ = 1 mark [2]
- (d) (i) exoskeleton / external skeleton ;
segmented / jointed, limbs / legs / appendages ;
segmented body ; [max 1]
- (ii) three parts to the body / head + thorax + abdomen ;
A sections / **R** segments
wings ; *ignore numbers of wings if given*
6 / 3 pairs of, legs ; [max 2]
- (e) (i) stripes (on head and neck), become / are, horizontal (when feeding) ;
less attractive to (tsetse), flies / insects ; **A** AW
A camouflage in grass ; [2]
- (ii) 1 ref to mutation and number of stripes ;
2 ref to number of stripes and likelihood of being bitten ;
3 ref to, disease / death ;
4 survivors breed ;
5 ref to offspring ; (fewer stripes = less / more stripes = more)
6 passing on advantageous, alleles / genes (for more stripes) ;
7 natural selection / survival of fittest ;
- R** artificial selection [max 3]
- [Total: 14]**

Page 7	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	31

5 (a) *balanced diet*

provides, sufficient energy / energy for needs ;
 provides, molecules / materials, for metabolism / equivalent ; **A** substances
 provides, nutrients / named nutrients ; CPFVM H₂O fibre

A minimum of any three named nutrients

A contains (all the) food, groups / types / classes **R** 'substances'
 in correct / right, quantities / proportions / amounts ;

A adequate / sufficient **R** 'equal'

R 'balanced' as it is in the question

[max 2]

(b) (i) liver ;

[1]

(ii) glucose ; **R** if two compounds are given

[1]

(iii) aerobic ;

carbon dioxide / water / no lactic acid, produced ;

anaerobic = 0 for the whole of (iii)

[2]

(c) dissolved / in solution / soluble ;
in plasma ;

[2]

(d) *mark name and function independently*

*read the functions of **A** and **B** together before awarding marks*

part	name of part	function
A	glomerulus ; A knot of capillaries R capillaries	filtration / filtering (blood) ; A increase in (blood) pressure / ref to high pressure A 'substances forced out' R diffusion
B	capsule ; R cup	collects filtrate / allows filtration ;
C	tubule ; <i>distal is neutral</i> R nephron / tube	(selective) <u>reabsorption</u> ; reabsorbs, water / glucose / salts / minerals / ions / amino acids ; <i>ignore</i> nutrients A description of reabsorption, e.g. active uptake of glucose absorption back into blood
D	collecting duct ;	(re)absorbs water / passes urine to pelvis <i>or</i> ureter ; R urea unless with water A waste substances

[8]

Page 8	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	31

- (e) (i) *award two marks if correct answer (1699 / 1699.2 / 1700) is given*
award one mark if no answer or incorrect answer but correct working is shown

$$1.18 \times 60 \times 24 / 1.18 \times 1440$$

$$1699 / 1699.2 / 1700 \text{ (dm}^3\text{) ;;} \quad [2]$$

- (ii) *award two marks if*
- correct answer (0.1) is given*
 - allow ecf from (e)(i) – so check calculation*

if no answer or incorrect answer award one mark for dividing 1.7 by something and multiplied by 100

$$1.7 / 1700 \times 100$$

$$0.1 \text{ (}\% \text{) ;;} \quad [2]$$

[Total: 20]

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MARK SCHEME for the May/June 2008 question paper

0610 BIOLOGY

0610/32

Paper 32 (Extended Theory), maximum raw mark 80

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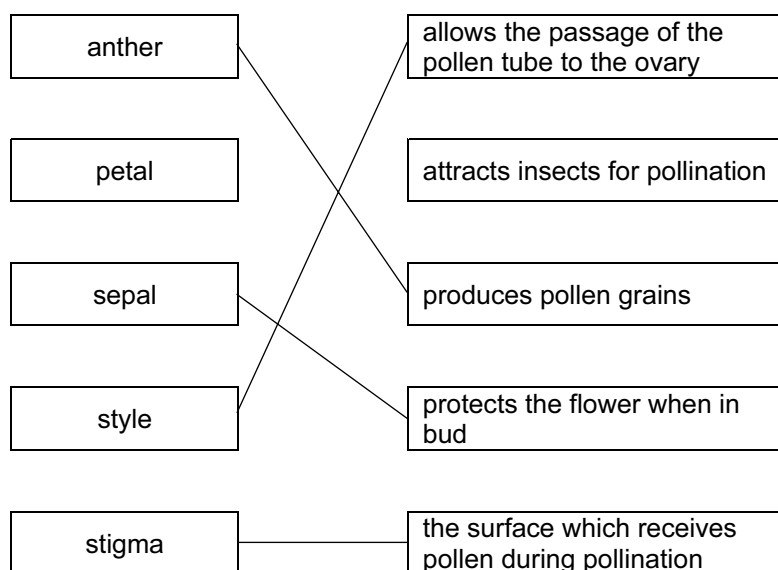
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A if lines do not touch box but meaning is clear



[4]

- (b) *assume answer is about stigma of wind-pollinated flower unless told otherwise, accept ora, 2 max for differences, 1 or 2 for significance*

wind-pollinated stigma,

insect-pollinated stigma

feathery / hairy ; **R** branched
ignore not sticky
 large(r) ; **A** large surface area
 outside flower / AW ;
A pendulous / exposed
ignore long and short

not, feathery / hairy ;
ignore sticky
 small(er) ; **A** small surface area
 inside flower / AW ;

[2 max]

explanation

to catch pollen / AW ; **A** for pollen to attach (to stigma)
 increase chance of pollination *or* make pollination more likely / easier

'more likely to catch pollen' = 2 marks

[max 3]

- (c) 1 little / less / AW / no, variation ; **R** cloning
 2 ref to becoming homozygous ; *ignore ref to gene*
 3 e.g. of consequence 'good' or 'bad' ;
 e.g. less chance of adapting to changing conditions / less ability to evolve /
 may become extinct / adapted variety spreads / AW ;
 4 greater chance of pollination / ensures pollination occurs ;
 A reproduction / fertilisation
 5 useful if no other plants (of same species) nearby ;
 6 less wastage of pollen ; **A** gametes
 7 not dependent on (named) agent of pollination ;

[max 3]

[Total: 10]

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	32

- 2 (a) (i) community / (all) organisms / animals **and** plants / (all) species / (all) populations / biotic components, (living together) in same, area / place / environment ; **R** habitat many habitats ;
interacting / interdependent / AW ; **A** description of food chains / food web (together with / interacting with)
abiotic / physical / non-living, factors / features ; [max 2]
- (ii) few (native) animals in Namibia eat it ;
grows uncontrollably / AW ; **R** reproduce quickly

(S. molesta has) flat leaves that grow over surface of water

so less light penetrates to plants below ;
less / no, photosynthesis ;
plants die and are decomposed by bacteria ;
aerobic bacteria / bacteria use oxygen ;
less oxygen for, animals ; **A** organisms / ref to BOD **R** plants
must be linked to less photosynthesis / bacteria use oxygen
less food for, animals / herbivores ;
destruction of, food chains / food web ;
AVP ; e.g. bacteria produce toxins [max 4]
- (b) (i) herbicides (may), kill / harm, all / other, plants ; **R** organisms consumer / beetle, will not eat all plants / specific to *S. molesta* ;
idea that herbicides will disrupt, food chain / community / ecosystem ;
herbicides accumulate in food chain ;
plants may develop resistance to herbicides ; [max 2]
- (ii) Australian beetle may have no (natural) predator ;
may eat other, plants / organisms ;
(increase in numbers and) cause damage to, crops / AW ;
compete with other plant eaters ;
idea that beetles disrupt, food chain / community / ecosystem ;
comparison with any other example, e.g. cane toad ; [max 2]
- (c) (i) S-shaped curve ; *ignore start at the origin / ignore death phase*
stationary phase may show fluctuations [1]
- (ii) *each label must be in correct place on curve*

lag ;
log / exponential ;
stable / stationary / constant ; **A** plateau / fluctuating / oscillating [3]
- (iii) space / grazing / (eaten by) beetles / (eaten by) herbivores / *C. saliniae* ; [1]

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	32

- (iv) *magnesium and nitrate may score 2 marks each*
accept other named ions and correct reasons
if candidate gives minerals and magnesium or nitrate - mark to max 2
competition must be qualified by one of these factors
R 'limit growth' as in the question – **A** 'less growth' in correct context

space ; **A** water in context of space (if not in (c)(iii))
 no more wetlands to grow over / nowhere for new leaves to grow /
 competition for raw materials or light / AW ; **A** less growth

grazing / eaten by herbivores (if not given in (c)(iii)) ;
 reduces leaf area for photosynthesis / removes products of photosynthesis / AW ;

light intensity ; **A** amount of light / less light / limited light
R light unqualified
 less energy trapped / for photosynthesis / AW ;

carbon dioxide, concentration / level ; **A** amount of CO₂ **R** CO₂ unqualified
 for photosynthesis ;

temperature ;
 ref to, enzymes / growth / photosynthesis / rate of chemical reactions ;

water ;
A any appropriate function of water ;
 e.g. turgidity / transport / photosynthesis / growth

minerals / nutrients / salts / ions ;
 ref to less growth ; **R** growth unqualified

magnesium (ions) ;
idea that lack restricts formation of chlorophyll ;

nitrate (ions) / ammonium ions / ammonia ; **R** nitrogen
 ref to less for making, amino acids / proteins / DNA / RNA / nucleic acids ;

iron (ions) ;
 for making chlorophyll ;

salt ; *as in increasing salinity of irrigated land*
 reduce water potential / make it difficult to absorb water ;

disease ;
 removes products of photosynthesis / less (material for) growth / less
 reproduction / AW ; **A** plants die' [max 4]

[Total: 19]

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	32

3 (a) (i) excretion ; [1]

- (ii) biological ; **A** made by, cells / organisms
catalyst / described ;
(made of) protein / AW ;

bio-catalyst = 2 marks [max 2]

(b) (i) pH ; [1]

- (ii) temperature ; **R** heat *ignore* room
size / mass / quantity / amount / surface area / type, of potato ;

volume of hydrogen peroxide ;
concentration of hydrogen peroxide ;

A 'amount' with respect to hydrogen peroxide
R refs to catalase / enzyme

[max 2]

- (c) *award two marks if correct answer (0.56 / 0.57 / 0.58) is given – may be in white space below the table*
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10 divided by 17.4

0.56 / 0.57 / 0.58 ;; [2]

(d) *graph*

- 1 *x-axis labelled* pH ;
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rate (of oxygen production / of reaction), $\text{cm}^3 \text{min}^{-1}$ / cm^3 per min ;
- 3 points all correct ; **A** *ecf from (c)*
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R if line goes beyond plotted points

[4]

- (e) (i) increase in rate to (pH) 6 then decrease / reaches a peak at (pH) 6 ;
any rate given as a data quote, **with $\text{cm}^3 \text{min}^{-1}$ or cm^3 per min** ;

[2]

- (ii) pH 6 is, optimum / when enzyme 'works best' ;

following points may refer to optimum or sub-optimum

ref to shape of enzyme ;

ref to active site ;

ref to denaturation ; **A** destroyed **R** 'killed'

ref to substrate / hydrogen peroxide, fitting into, enzyme / active site ;

[max 3]

[Total: 17]

Page 6	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	32

- 4 (a) try to mate them together, failure = suggests different species ;
mate together, no offspring = suggests different species ;
breed together and see if any offspring are, sterile / infertile ;
test DNA / examine chromosomes ; [max 1]
- (b) (i) continuous ; **A** discrete [1]
- (ii) *Equus grevyi* ; **A** *grevyi* [1]
- (c) (i) phenotype ; **A** close phonetic spellings [1]
- (ii) *these two points are linked – change unqualified does not get a mark, but change in DNA gets 2 marks*
change / AW ; e.g. substitution / deletion / error in meiosis
in, DNA / gene(s) / chromosome(s) ;
change in genotype / genetic, structure / 'genetic make-up' = 1 mark [2]
- (d) (i) exoskeleton / external skeleton ;
segmented / jointed, limbs / legs / appendages ;
segmented body ; [max 1]
- (ii) three parts to the body / head + thorax + abdomen ;
A sections / **R** segments
wings ; *ignore numbers of wings if given*
6 / 3 pairs of, legs ; [max 2]
- (e) (i) stripes (on head and neck), become / are, horizontal (when feeding) ;
less attractive to (tsetse), flies / insects ;
A camouflage in grass ; [2]
- (ii) 1 ref to mutation and number of stripes ;
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4 survivors breed ;
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6 passing on advantageous, alleles / genes (for more stripes) ;
7 natural selection / survival of fittest ;
- R** artificial selection [max 3]
- [Total: 14]**

Page 7	Mark Scheme	Syllabus	Paper
	IGCSE – May/June 2008	0610	32

5 (a) *balanced diet*

provides, sufficient energy / energy for needs ;
provides, molecules / materials, for metabolism / equivalent ; **A** substances
provides, nutrients / named nutrients ; CPFVM H₂O fibre

A minimum of any three named nutrients

A contains (all the) food, groups / types / classes **R** 'substances'
in correct / right, quantities / proportions / amounts ;

A adequate / sufficient **R** 'equal'

R 'balanced' as it is in the question

[max 2]

(b) (i) liver ;

[1]

(ii) glucose ; **R** if two compounds are given

[1]

(iii) aerobic ;

carbon dioxide / water / no lactic acid, produced ;

anaerobic = 0 for the whole of (iii)

[2]

(c) dissolved / in solution / soluble ;
in plasma ;

[2]

(d) *mark name and function independently*

*read the functions of **A** and **B** together before awarding marks*

part	name of part	function
A	glomerulus ; A knot / bundle, of capillaries R capillaries	filtration / filtering (blood) ; A increase in (blood) pressure / ref to high pressure A 'substances forced out' R diffusion
B	capsule ; R cup	collects filtrate / allows filtration ;
C	tubule ; <i>distal is neutral</i> R nephron / tube	(selective) <u>reabsorption</u> ; reabsorbs, water / glucose / salts / minerals / ions / amino acids ; <i>ignore</i> nutrients A description of reabsorption, e.g. active uptake of glucose absorption back into blood
D	collecting duct ;	(re)absorbs water / passes urine to pelvis <i>or</i> ureter ; R urea unless with water A waste substances

[8]

Page 8	Mark Scheme	Syllabus	Paper
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- (e) (i) *award two marks if correct answer (1699 / 1699.2 / 1700) is given*
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$$1.18 \times 60 \times 24 / 1.18 \times 1440$$

$$1699 / 1699.2 / 1700 \text{ (dm}^3\text{) ;;} \quad [2]$$

- (ii) *award two marks if*
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 - allow ecf from (e)(i) – so check calculation*

if no answer or incorrect answer award one mark for dividing 1.7 by something and multiplied by 100

$$1.7 / 1700 \times 100$$

$$0.1 \text{ (}\% \text{) ;;} \quad [2]$$

[Total: 20]