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CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2013 series

0610 BIOLOGY

0610/22 Paper 2 (Core 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, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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Mark schemes will use these abbreviations

- ; separates marking points
- / alternatives
- **R** reject
- **A** accept (for answers correctly cued by the question)
- **I** ignore as irrelevant
- **ecf** error carried forward
- **AW** alternative wording (where responses vary more than usual)
- **AVP** alternative valid point
- **ORA** or reverse argument
- **OWTTE** or words to that effect
- underline actual word given must be used by candidate (grammatical variants excepted)
- ( ) the word / phrase in brackets is not required but sets the context
- **D, L, T, Q** quality of: drawing / labelling /
- table / detail as indicated
- max indicates the maximum number of marks

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	Answer	Marks	Guidance for Examiners
1 (a)	**A** – crustacean; **B** – annelid; **C** – fish; **D** – reptile;	[4]	A – arthropod
		[Total: 4]	
2 (a) (i)	1 transport around the body / OWTTE; 2 forming cytoplasm of cells; 3 getting rid of excretory materials; 4 temperature regulation; 5 medium for / used in chemical reactions; 6 buffer / shock absorber for fetus;	max [3]	2. A – forming body fluids 4 A – used in sweat 6. A – protecting fetus
(ii)	homeostasis;	[1]	
(b) (i)	respiration;	[1]	A – condensation reactions
(ii)	1400 cm^3;	[1]	

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(c) (i)	reabsorbs mineral salts / named salt; reabsorbs glucose; excretes urea;	[3]	A – pH regulation A – excretes hormones, excretes urine
(ii)	the volume will decrease / less water; the concentration will increase / colour will be darker;	[2]	
		[Total: 11]	

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3 (a)	1 (mucus) difficult to cough out; 2 difficult for cilia to move (it out); 3 bacteria / pathogens trapped in it; 4 bacteria / pathogens in warm / moist environment 5 reproduce / AW;	max [3]	A – mucus gets stuck in airways
(b)	an allele that only has its effect in absence of dominant allele / when in homozygous state;	[1]	
(c) (i)	ff;	[1]	
(ii)	Ff and Ff;	[1]	A – Ff
(iii)	(parents) (Ff Ff) (gametes) F f F f; (offspring) FF Ff Ff ff; (phenotypes) NM NM NM CF (possibility) 25% / 1 in 4 / 1:3;	max [4]	No mark for parent line as repeat of (c)(ii) Key – NM normal mucus CF cystic fibrosis
		[Total: 10]	

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<table>
<tr><td>4 (a)</td><td>1 material extracted from the environment;
2 not replaced / renewed;
3 at least for millions of years / very long time;
4 e.g. fossil fuel / gas / coal / (crude) oil / iron ore / limestone;</td><td>max [3]</td><td>A – refs to any non-renewable resource</td></tr>
<tr><td>(b)</td><td>(harmful) liquid waste;
e.g. human excreta / surface drainage / industrial effluent;</td><td>[2]</td><td></td></tr>
<tr><td></td><td></td><td>[Total: 5]</td><td></td></tr>
<tr><td>5</td><td>
<table>
<tr><th>function</th><th>letter</th></tr>
<tr><td>produces egg cells</td><td>E (no mark)</td></tr>
<tr><td>where sperm are deposited during intercourse</td><td>B;</td></tr>
<tr><td>ring of muscle that relaxes to allow the baby to be born</td><td>F;</td></tr>
<tr><td>where implantation takes place</td><td>C;</td></tr>
<tr><td>where fertilisation takes place</td><td>D;</td></tr>
</table>
</td><td>[4]</td><td></td></tr>
<tr><td></td><td></td><td>[Total: 4]</td><td></td></tr>
</table>

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6 (a) (i)	ring of xylem / phloem (bundles); inner most part labelled as xylem / outermost part labelled phloem;	[2]	A – if only half bundles (xylem) are drawn in a ring
(ii)	sucrose / amino acids;	[1]	
(b)	water enters root hair (cell); by osmosis / diffusion; moves across root cortex (by osmosis); enters xylem; moves to leaf mesophyll (cells); by transpirational pull / force;	max [3]	Any three – 1 mark each
		[Total: 6]	

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7 (a) (i)	**A** – relay / connector / inter(mediate) neurone; **B** – motor neurone;	[2]	A – internuncial neurone
(ii)	automatic / no thinking involved / involuntary; rapid; links specific stimulus to response;	max [2]	Any two – 1 mark each
(b)	muscle / gland / structure that brings about an action;	[1]	
(c) (i)	**C** – triceps (muscle); **D** – biceps (muscle);	[2]	I – extensor I – flexor
(ii)	1 muscle **D** pulls on bones of lower arm; 2 lower arm is raised; 3 pivoting at elbow / joint; 4 muscle **C** relaxes;	max [2]	Any two – 1 mark each MPs 1 and 4 can both be awarded even if “muscle” appears only once.
		[Total: 9]	

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8 (a)	carbon dioxide; water;	 [2]	A – either response in either space
(b) (i)	0.2 (arbitrary units);	[1]	
(ii)	150 (cm^3 per beat);	[1]	
(c) (i)	1 body / muscles need more energy / more respiration; 2 (more) glucose / oxygen; 3 delivered by blood; 4 (more) carbon dioxide / heat removed (by blood); 5 need increase in rate of delivery / removal; 6 rate of <u>heart</u> beat increases;	 max [3]	Any three – 1 mark each Only need ref to “increase” or “more” once in response
(ii)	it falls / returns to normal / resting rate / 70 (beats per minute); does not fall straight away / immediately / OWTTE;	 [2]	 A – falls gradually
(d)	larger / contractions of heart / ventricles at each beat; ref to factor that causes increased stroke volume e.g. adrenalin / exercise;	 max [1]	 I – smoking
		[Total: 10]	

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9 (a) (i)	mitosis / mitotic;	[1]	
(ii)	will all have identical genetic make-up / asexual reproduction happening;	[1]	A – same genotype
(iii)	1 different growing conditions / competition; 2 e.g. light / water / minerals etc; 3 damage due to disease / pests; 4 original tubers of different sizes; 5 age of tubers / time since planting;	max [2]	Any two – 1 mark each A – nutrients
(b) (i)	1 sexual reproduction happening; 2 male gametes / pollen can come from any plant; 3 gametes / pollen may vary as formed by meiosis; 4 different combinations of genes / alleles possible;	max [3]	Any three – 1 mark each A – ref to self / cross pollination

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(ii)	1 select plants with desired characteristics / breed the two varieties with one another / OWTTE; 2 isolate flowers; 3 remove stamens from some / stigmas from others; 4 cross pollinate; 5 collect seeds; 6 grow plants to check success; 7 select next generation of plants / discard any without one of the features; 8 repeat process;	max [3]	Any three – 1 mark each A – remove anthers, carpels A – ref to genetic modification; A – AVP for GM
		[Total: 10]	

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10 (a)	(an ecosystem is) all the organisms and their environment; interacting together;	 [2]	
(b) (i)	sun / sunlight;	[1]	
(ii)	heather / plants;	[1]	
(c)	heather, beetles / other insects, shrews, adders / stoats, chain starts with heather; four linked organisms as on web; arrows showing direction of energy flow;	 [3]	sequence for guidance
(d) (i)	*hares* less adult grouse for food for eagles; eagles eat more hares, so numbers drop; **OR** as less grouse eating heather; more food for hares, so numbers rise;	 [2]	

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(ii)	*shrews* as less grouse eating heather, then more for beetles / other insects; more food for shrews, so numbers rise; **OR** eagles eat more rabbits / hares thus less food for stoats; stoats eat more shrews, so numbers drop;	[2]	
		[Total: 11]	

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