CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2013 series

0610 BIOLOGY

0610/22 (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 October/November 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
- 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
- maxindicates the maximum number of marks

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Question	Answer	Marks	Guidance for Examiners
1 (a)	1 carbohydrates / glucose formed; 2 from raw materials / named materials; 3 needs light (energy); 4 occurs in green plants / only in plants;	Max [3]	1 A – sugar A – ref to chloroplasts / chlorophyll
(b) (i)	converted into sucrose / made soluble; transported via phloem / sieve tubes; ref to translocation / description of translocation;	Max [2]	A – ref to glucose
(ii)	may allow plant to survive adverse growing conditions; provides source of food for re-growth (before new leaves develop); ref to starch being insoluble;	Max [1]	A – description of condition
(c)	plant: storage organ Allium; A; Colocasia E; Cassava; D; Zingiber; B; Solanum; C;	Max [4]	
		[Total: 10]	

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2 (a) (i)	aorta;	[1]	
(ii)	coronary artery;	[1]	A – coronary vessel R – coronary vein
(iii)	no oxygen getting to heart muscle; severe pain / heart attack occurs / heart muscle dies;	 Max [1]	 A – description of heart attack
(iv)	wall / muscle of left ventricle much thicker / stronger than wall / muscle of right ventricle; L.V. has to force blood all round body / must create more force / pressure;	 [2]	A – ref LV valve 2 flaps, RV valve 3 flaps – 1 mark A – ORA
(b)	select suitable / named position (of artery); press on artery with fingers; count number of beats per minute / unit time;	 Max [2]	 R – thumb A – ref to pulse / heart rate meter
		[Total: 7]	

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3 (a) (i)	11 years old;	[1]	
(ii)	need for control very early on;	[1]	A – idea of better processing of stimuli / learning
(iii)	13 and 18;	[1]	A – ranges within this overall range A – 13 to 18
(b) (i)	testosterone;	[1]	
(ii)	oestrogen;	[1]	R – progesterone
(iii)	1 (long) bones of limbs; 2 shoulder / pectoral girdle; 3 rib bones; 4 skeletal muscles; 5 larynx / voice box; 6 hair follicles / hair suitably qualified;	Max [2]	NB – structures NOT functions 2 A – shoulders broaden 3 A – chest broadens 4 A – limb muscles e.g. pubic, facial hair etc A – skeleton if MP1, 2, 3 are not awarded
(c)	1 length of stride increased; 2 muscle size / power / strength increased; 3 increased vital capacity / depth of breathing; 4 aggression / competition;	Max [2]	
		[Total: 9]	

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4 (a)	1 seed develops from the zygote; 2 formed by fusion of two gametes / fertilisation; 3 gametes genetically different; 4 male gamete / pollen (grain) may come from different plant; 5 fruit pod formed from tissue of parent / female plant / carpel; 6 fruit (coat) genetically identical to female parent;	Max [3]	4 A – gametes come from different plants
(b) (i)	**A** – plumule; **B** – radicle;	Max [2]	A – shoot **and** root for 1 mark
(ii)	suitable temperature; (supply of) oxygen; (supply of) water;	[3]	A – temperature qualified / warmth A – moisture
(c)	*growth* – permanent increase; in size / dry mass; in cell size / number; *development* – increase in complexity / differentiation / specialisation;	Max [3]	
		[Total: 11]	

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5 (a) (i)	**A** – iris; **B** – pupil; **C** – cornea; **D** – retina;	 [4]	 A – aqueous humour I – sclera, conjunctiva A – rods / cones
(ii)	to carry (nerve / electrical) impulses to the brain;	[1]	A – signal I – messages, information
(iii)	there are no light sensitive cells there / forms no nerve impulses / cannot detect light;	[1]	A – ref to no rods and cones / no retina
(b)	1 ciliary muscles contract / form a smaller circle; 2 reduces tension in suspensory ligaments / ligaments are slackened; 3 (elastic) lens becomes more convex / curved; 4 lens bends light rays more / brings rays to focus;	 Max [3]	1 A – shorten 2 A – loosened 3 A – more rounded, more spherical 4 A – focal length decreased
		[Total: 9]	

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6 (a)	<table><tr><th>function</th><th>letter</th></tr><tr><td>helps to prevent dehydration of the body</td><td>B</td></tr><tr><td>detects changes in the external temperature</td><td>H;</td></tr><tr><td>dilates when body temperature rises</td><td>E;</td></tr><tr><td>prevents most heat loss from the body</td><td>F;</td></tr><tr><td>produces a fluid to help the body lose heat</td><td>G;</td></tr></table>	[4]	No mark for B
(b)	**X**– hair;	[1]	
		[Total: 5]	

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7 (a)	web shows a number of linked food chains / the food chains in an ecosystem; shows the flow of energy through the ecosystem;	[2]	A – feeding relationships between members / organisms of an ecosystem
(b) (i)	(brown) bear;	[1]	
(ii)	an animal that feeds / gets its energy from other animals;	[1]	A – only eats meat I – organisms R – plants
(iii)	1 energy is lost (at each level) from a food chain; 2 by respiration / movement etc.; 3 needs a large number of organisms at lower levels to support one top carnivore / OWTTE; 4 not enough energy at top of food chain to support more / OWTTE;	Max [2]	2 A – excretion
(c)	*arctic foxes* – lose one of their food sources; must feed on more pikas / arctic hares; numbers may fall; *arctic hares* – have more lichen to feed on so numbers increase; **OR** more eaten by (brown) bears / (snowy) owls / (arctic) foxes so numbers fall;	Max [3]	A – more competition for pikas / hares A – logical suggestions following on from number change of foxes in (i)
		[Total: 9]	

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8 (a)	suitable scale selected; three points correctly plotted; other two points plotted correctly; line drawn;	[4]	
(b) (i)	1.8 (t ha^{-1});	[1]	A – 1.3 times
(ii)	77 - 78 (kg ha^{-1});	[1]	Check against candidate's graph
(iii)	yield drops (above this level); risk of wastage (because of run-off); fertiliser is expensive / waste of money;	Max [2]	A – crop damaged / growth reduced (above this level) A – any other suitable explanation
(iv)	all on one field of two yield is 7 + 3 (t / ha^{-2}); spread over two fields yield is 2 × 4.8 (t / ha^{-2}); (decision is to put all fertiliser on one field)	[2]	A – 10 (t / ha^{-2}); A – 9.6 (t / ha^{-2}); No mark for decision
(c)	1 nitrogen / nitrates is needed to form amino acids; 2 amino acids formed into proteins; 3 proteins needed to form new cells / for growth; 4 larger plants produce heavier crops / more seeds / higher yield;	Max [3]	A – nitrogen / nitrates needed to form protein if neither MP1 or 2 awarded A – faster growth
		[Total: 13]	

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9 (a) (i)	carbon dioxide; sulfur dioxide;	[2]	A – lead, carbon monoxide, nitrogen oxides, dust / smoke particles
(ii)	1 combustion / burning produces carbon dioxide; 2 this is released in fumes / from vehicle; 3 increases pollution further;	Max [3]	A – any other named gas / carbon monoxide / sulfur dioxide / carbon particles / oxides of nitrogen
(b)	babies (in prams) nearer / more exposed to exhaust fumes; lungs etc. not yet fully developed; sulfur dioxide irritates airways; may lead to bronchitis; coughing etc may put extra strain on heart; increased risk of asthma attacks;	Max [2]	A – weak lungs
		[Total: 7]	

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