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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0610 BIOLOGY

0610/31 Paper 3 (Extended Theory), maximum raw mark 80

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Abbreviations used in the Mark Scheme

- **;** separates marking points
- **/** separates alternatives within a marking point
- **R** reject
- **ignore** mark as if this material was not present
- **A** accept (a less than ideal answer which should be marked correct)
- AW alternative wording (accept other ways of expressing the same idea)
- underline words underlined (or grammatical variants of them) must be present
- max indicates the maximum number of marks that can be awarded
- mark independently the second mark may be given even if the first mark is wrong
- ecf credit a correct statement that follows a previous wrong response
- ( ) the word / phrase in brackets is not required, but sets the context
- **ora** or reverse argument
- AVP any valid point

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Question	Answer	Marks	Additional Guidance
1 (a) (i)	reptiles ;	[1]	
(ii)	go to 2 ; go to 3 ; go to 4 ; *Chalcides minutus* B ; go to 5 ; go to 6 ; *Brookesia perarmata* G ; *Calumma parsonii* C ; *Amblyrhynchus cristatus* A ; *Cyclura lewisi* E ; *Abronia graminea* F ; *Varanus komodoensis* **D** ;	[3]	5 / 6 right = 3 3 / 4 right = 2 1 / 2 right = 1 0 right = 0

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Question	Answer	Marks	Additional Guidance
(b)	encourages biodiversity ; **ora** prevents extinction ; encourages genetic diversity (within each species) ; maintain food, webs/chains ; food for predators ; increasing research / source of medicine ; AVP ;; e.g. maintain habitats for other organisms / ethical / moral / aesthetic reasons / tourism	max [3]	**A** species diversity **A** an example of feeding
(c) (i)	reduced genetic diversity ; identical offspring ; negative traits passed on ; more competition for local resources ; less chance of survival in a varying environment ; one disease could wipe out total population ; AVP ; e.g. less chance of evolving	max [2]	**A** no genetic diversity **A** unfavourable / bad traits.
(ii)	offspring may not be as well adapted to environment ; slower process / takes longer (than asexual reproduction) ; requires partner / two parents ; less energy efficient / requires more energy / many eggs is wasteful ; AVP ;	max [2]	**A** description e.g. good characteristics are not always passed on.
(d) (i)	reduction division / chromosome number is halved / one set of chromosomes ; diploid to haploid ; for production of gametes ; daughter cells are not genetically identical / genetically different ;	[2]	to each other or parent

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Question	Answer	Marks	Additional Guidance
(ii)	for adaption to, new / changed environment ; causes (genetic) variation ; competition for survival ; best suited reproduce ; allows natural selection ; allows evolution ; AVP ;	max [3]	**ignore** mutations unqualified.
		[Total: 16]	
2 (a) (i)	*award two marks if the answer is correct – 12* *if there is no answer or it is incorrect, award one mark for correct working* 6 s – 1s = 5 seconds for 1 breath ; 60 / 5 = 12 (breaths per minute) ;	max [2]	Alternative: 4 s – 9 s = 5 s for 1 breath Allow 10 s for 2 breaths for working mark.
(ii)	slower breathing rate before match ; **ora** deeper breathing during match ; **ora** during the match breaths are different from each other ; **ora** pressure (in lungs) increases during the match ;	max [3]	
(b)	external intercostal muscles contract ; internal intercostal muscles relax ; lifts ribs, upwards / outwards ; diaphragm contracts ; diaphragm, flattens / drops ; volume of, thorax / lungs / chest, increases ; pressure in, thorax / lungs / chest, decreases ; air flows in down a pressure gradient / description ;	max [4]	Note: internal and external must be stated
(c) (i)	(CO_2) is metabolic / AW, waste ; (CO_2) is toxic ;	max [1]	**ignore** – from body (in question stem)

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Additional Guidance</th></tr>
<tr><td>(ii)</td><td>(blood) plasma ;</td><td>[1]</td><td></td></tr>
<tr><td>(iii)</td><td>pH decreases / becomes acidic ;</td><td>[1]</td><td></td></tr>
<tr><td>(d)</td><td>more, (aerobic) respiration ;
steeper concentration gradient ;</td><td>[2]</td><td>A description of gradient.</td></tr>
<tr><td></td><td></td><td>[Total: 14]</td><td></td></tr>
<tr><td>3 (a)</td><td><table><tr><th>name of part</th><th>letter from Fig. 3.1</th></tr><tr><td>hair</td><td>R ;</td></tr><tr><td>blood vessel / arteriole / small artery</td><td>S ;</td></tr><tr><td>sweat gland</td><td>U ;</td></tr></table></td><td>[3]</td><td>1 mark per correct row

R artery, capillary</td></tr>
<tr><td>(b)</td><td>(involuntary responses are) automatic / no conscious decision / does not involve thought / decision making / innate / reflex ;
(higher centres of) brain not involved ;
faster / immediate / rapid ;
response always the same / response specific to stimulus ;
may involve glands ;
they are protective / linked to survival / AW ;
AVP ;</td><td>max [3]</td><td>A reverse argument written in favour of voluntary responses if this is clearly stated</td></tr>
</table>

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Question	Answer	Marks	Additional Guidance
(c)	(change in) temperature / hot / cold is stimulus ; temperature receptors (in skin) / V ; (electric) impulse ; travels through sensory neurone ; to brain ; relay / connector / intermediate neurone ; motor neurone ; to effector ; example of effector (arteriole / erector, muscle) ;	max [4]	**R** messages points need to be in the correct sequence **A** 'muscle' unqualified.
(d)	change in temperature, is detected / acts as a stimulus ; to keep temperature, constant / at 37 °C / within limits / near set point / at the norm / AW ; corrective / opposite, action by the body ; return to normal temperature ; correct ref to homeostasis ;	max [3]	
		[Total: 13]	
4 (a)	(group of) cells with similar structure(s) working together to perform a function **;**	[1]	
(b) (i)	(spongy) mesophyll ;	[1]	**ignore** palisade
(ii)	diffusion ;	[1]	
(c)	no chloroplasts / chlorophyll in (root hair cells) ; **ora** root hair cells are not column shaped ; **ora** (root hair cells) have long protrusion / extension / larger surface area ; **ora**	max [2]	**R** root hair cells have hairs

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Question	Answer	Marks	Additional Guidance
(d)	**1** water moves from root cells, into xylem ; **2** cohesion / adhesion AW, of water molecules ; **3** (this) pulls on / creates tension (in water column in xylem) ; **4** Water moves up / through, the xylem ; **5** mass flow of water (in xylem) / transpiration stream ; **6** water moves into leaf by osmosis (from xylem) ; **7** loss of water from leaf (cells) lowers water potential ; **A** ref to water potential gradient **8** evaporation, from surfaces of (mesophyll) cells / into air spaces (in leaf) ;	max [4]	**ignore** method of movement across the root **A** 'stick together', ref to polar **ignore** 'water concentration' **R** 'through stomata'
(e) (i)	more leaf hairs on lower surface ; leaf hairs appear larger on upper surface ;	max [1]	
(ii)	(increased humidity at lower surface) will reduce transpiration rate ; causes lower water demand / less water loss / reduces chances of wilting ; reduced, concentration gradient (water vapour) / water potential gradient ; creates a boundary layer / AW ;	max [2]	less water loss by transpiration = 2 marks.
		[Total:12]	
5 (a)	*method of pollination*: wind ; *explanation to max 2:* Feathery / AW, stigma ; long, filament ; large, anthers / stamens ; anthers / stamens, hang outside flower ; anthers loosely attached (to filament) ; light pollen ; no petals ;	[1] + [2] max [3]	**A** 'only bracts'

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Question	Answer	Marks	Additional Guidance
(b)	cross (pollination) ;	[1]	
(c)	pollen tube ; delivers male gamete / pollen nucleus / male nucleus to ovule ; AW	[2]	**A** female gamete / egg / female nucleus / ovum.
(d)	*idea that* tip of pollen tube opens / AW ; gametes / sex cells / ova and pollen nuclei, fuse / join / combine ; formation of zygote ; diploid ;	max [2]	**A** male nucleus for pollen nucleus **ignore** pollen unqualified **ignore** meet / mix
(e) (i)	ovule ;	[1]	
(ii)	ovary (wall) ;	[1]	
(iii)	colonise new areas ; reduce (intraspecific) competition ; reduce inbreeding ; **ora**	max [1]	
(f)	stored food / food reserves (in seed) broken down ; named enzyme plus substrate ; product plus use ; enzymes required in process of respiration ;	max [2]	
		[Total:13]	

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Question	Expected Answers	Marks	Additional Guidance
6 (a) (i)	*award two marks if the answer is correct – 49* *if there is no answer or it is incorrect, award one mark for correct working* (207+65+4+410+38+527=1251) (1251 / 2558) x 100 **;** 49 (%) ;;	[2]	**ignore** 48.9 %
(ii)	(awareness / education) to use less paper ; alternatives to using paper ;	max [1]	
(iii)	green kitchen waste ; glass ;	max [1]	
(b)	paper collection / sorting / sent to recycling centre ; shredding ; pulping ; requires water / soaking ; deinking / described ; requires bleach ; rolling / pressing / flattened ; AVP ;	max [4]	process must be in the correct sequence **A** 'made thin'
(c)	global warming ; increase in rate of photosynthesis ; causes increase in plant growth / crop yield / vegetation ; any two qualified examples of environment effects of global warming e.g. flooding, extreme weather conditions, qualified habitat change, reduced biodiversity ;; AVP ; e.g. disruption to migration routes	max [4]	**R** holes in ozone, acid rain, polar ice caps melting.
		[Total:12]	

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