CAMBRIDGE INTERNATIONAL EXAMINATIONS

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

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 2015 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

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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

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

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

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)

<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>

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

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'

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]	

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]	