CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 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.

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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	Answers	Marks	Guidance for examiners
1 (a)	(presence of) backbone ;	[1]	**ignore** vertebrae
(b) (i)	fish ; reptile ;	[2]	
(ii)	scaly skin / scales ;	[1]	
		[Total: 4]	
2 (a)	protein ; reactions ; catalysts ;	[3]	
(b)	break down of large / insoluble (food) molecules ; into small / soluble (water) molecules ; reference to mechanical / chemical process / AW ;	max [2]	
(c) (i)	(pH) 2 ;	[1]	**A** 2 or 2.0 **R** other decimal points
(ii)	stomach ;	[1]	
(iii)	protein / gelatin ; amino acids ;	[2]	
(d)	the colourless area would be produced more quickly / would be bigger, if left for same time period ; it works faster / AW ;	[1]	
		[Total: 10]	

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Question	Answers	Marks	Guidance for examiners
3 (a)	name / letter urethra ; / G kidney / A ; bladder ; / E renal artery / C ; ureter ; / D	[5]	
(b) (i)	liver ;	[1]	
(ii)	(excess) amino acids / proteins ;	[1]	**A** polypeptides / peptides / peptones
(iii)	blood plasma / urine more glucose / glucose present / glucose absent ; less urea / **ora** ; less salts / **ora** ; less water / more concentrated urine / **ora** ;	max [3]	
		[Total: 10]	

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Question	Answers	Marks	Guidance for examiners
4 (a) (i)	mucus is difficult to move / AW ; increased coughing / AW ; it will become difficult to breathe / AW ; shortage of oxygen / AW ; weakness caused by poor respiration / AW ; bacteria / microorganisms remain in lungs / AW ; infection is possible / AW ;	max [2]	
(ii)	fat-digesting enzyme / lipase cannot reach intestine ; fat not broken down / digested ; to fatty acids and / or glycerol ;	max [2]	**A** fat not emulsified
(b)	an alternative form of a gene ;	[1]	
(c) (i)	**Nn** ; and **Nn** ;	[2]	
(ii)	**nn** ;	[1]	
(iii)	child 1 : **Nn** or **NN** ; child 3 : **Nn** or **NN** ;	[2]	
(d)	¼ or 25% or 0.25 or 1 in 4 or 1:3 ;	[1]	
		[Total: 11]	

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<table>
<tr><th>Question</th><th>Answers</th><th>Marks</th><th>Guidance for examiners</th></tr>
<tr><td>5 (a)</td><td>testa / seed coat ;
cotyledon / food store ;
radicle / young root ;</td><td>[3]</td><td></td></tr>
<tr><td>(b) (i)</td><td>prevents drying out ;
prevents fungal or bacterial attack on seed contents / AW ;
protects / prevents damage (of the seed) ;
prevents digestion (by enzymes) inside intestine of animal ;</td><td>max [1]</td><td></td></tr>
<tr><td>(ii)</td><td>animal dispersal (idea of) ;
fruit / tomato is eaten by animal / sticks to bird's beak ;
seeds are not digested inside intestine of animal ;
animal moves to new habitat ;
undigested seeds pass out in faeces of animal ;</td><td>max [2]</td><td></td></tr>
<tr><td>(c) (i)</td><td>an increase in complexity / AW ;</td><td>[1]</td><td></td></tr>
<tr><td>(ii)</td><td><table>
<tr><td>A</td><td>NO</td><td>water is required for germination / don't have water ;</td></tr>
<tr><td>B</td><td>NO</td><td>oxygen is required for germination / don't have oxygen ;</td></tr>
<tr><td>C</td><td>YES</td><td>both oxygen and water available ;</td></tr>
<tr><td>D</td><td>YES</td><td>foil has no effect – light is not required for germination / both oxygen and water available ;</td></tr>
</table></td><td>max [5]</td><td>1 mark if YES / NO column correct

1 mark for each correct explanation</td></tr>
<tr><td></td><td></td><td>[Total: 12]</td><td></td></tr>
</table>

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<table>
<tr><th>Question</th><th>Answers</th><th>Marks</th><th>Guidance for examiners</th></tr>
<tr><td>6 (a)</td><td>plant beetle frog snake ;</td><td>[1]</td><td></td></tr>
<tr><td>(b) (i)</td><td>P – lag (phase) ;
Q – log / exponential (phase) ;
R – stationary (phase) ;
S – decline / death (phase) ;</td><td>[4]</td><td></td></tr>
<tr><td>(ii)</td><td>more deaths than births ;
fewer beetles so less food for frogs / more predators ;
snakes catch / eat more frogs ;
frogs catch a disease and die ;</td><td>max [3]</td><td></td></tr>
<tr><td></td><td></td><td>[Total: 8]</td><td></td></tr>
<tr><td>7</td><td>
<table>
<tr><th>definition</th><th>matching word or phrase</th></tr>
<tr><td>an animal…</td><td>carnivore ;</td></tr>
<tr><td>a network..</td><td>food web ;</td></tr>
<tr><td>an organism..</td><td>producer ;</td></tr>
<tr><td>the position…</td><td>trophic level ;</td></tr>
<tr><td>an animal…</td><td>herbivore ;</td></tr>
<tr><td>a group of …</td><td>population ;</td></tr>
<tr><td>a unit of …</td><td>ecosystem ;</td></tr>
<tr><td>a diagram which …</td><td>pyramid of numbers ;</td></tr>
</table>
</td><td>[8]</td><td></td></tr>
<tr><td></td><td></td><td>[Total: 8]</td><td></td></tr>
</table>

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Question	Answers	Marks	Guidance for examiners
8 (a)	none **B** **E** **D** **C** **A**	[5]	
(b)	**A**: has long hair-like extension ; thin walls ; increases / large surface area ; for absorption (of water / minerals) ; has no chloroplasts ; underground so does not photosynthesise ; **E**: presence of chloroplasts ; for light absorption ; for photosynthesis ; long and thin / upright shape ; many cells can be packed together for maximum light absorption (for photosynthesis) ;	[4]	1 mark for structural adaptation and 1 mark for function, for each of **A** and **E**
		[Total: 9]	

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<table>
<tr><th>Question</th><th>Answers</th><th>Marks</th><th>Guidance for examiners</th></tr>
<tr><td>9 (a)</td><td>(water moves by) osmosis / diffusion ;
down a (water potential) gradient/ from a high concentration of water to a low concentration of water ;
lower water potential / AW in the blood ;
colon has a high concentration of water / blood has a low concentration of water ;
because the membrane is partially permeable ;</td><td>max [3]</td><td></td></tr>
<tr><td>(b) (i)</td><td><table>
<tr><th>length</th><th>time</th><th>surface area</th><th>volume</th><th>sa to volume ratio</th></tr>
<tr><td>2</td><td>41</td><td>24</td><td>8</td><td>3:1 ;</td></tr>
<tr><td>3</td><td>76</td><td>54</td><td>27</td><td>2:1 ;</td></tr>
</table></td><td>[2]</td><td>1 mark for each correct line
A if just ratio stated</td></tr>
<tr><td>(ii)</td><td>as surface area to volume ratio falls the efficiency of diffusion falls / time taken for diffusion increases / ora ;</td><td>[1]</td><td></td></tr>
<tr><td>(c)</td><td>many air sacs / alveoli ;
to increase / large surface area ;
idea of extensive blood supply ;
to remove absorbed materials ;
one cell thick ;
short diffusion distance ;</td><td>max [2]</td><td></td></tr>
<tr><td></td><td></td><td>[Total: 8]</td><td></td></tr>
</table>

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