CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0610 BIOLOGY

0610/21 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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Cambridge is publishing the mark schemes for the May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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<table>
<tr><th></th><th>Answer</th><th>Marks</th><th>Guidance for Examiners</th></tr>
<tr><td>1</td><td>A (M.) ermine ;
B (V.) vulpes ;
C (O.) cuniculus ;
D (M.) vison ;
E (M.) leucurus ;</td><td>max [4]</td><td>5 correct = 4
3 or 4 correct = 3
2 correct = 2
1 correct = 1</td></tr>
<tr><td></td><td></td><td>[Total: 4]</td><td></td></tr>
<tr><td>2 (a) (i)</td><td><u>buffalo</u> ;</td><td>[1]</td><td></td></tr>
<tr><td>(ii)</td><td><u>300</u> ;</td><td>[1]</td><td></td></tr>
<tr><td>(iii)</td><td><u>elephant</u> ;</td><td>[1]</td><td></td></tr>
<tr><td>(iv)</td><td>4 ;</td><td>[2]</td><td></td></tr>
<tr><td>(b)</td><td>(idea of) the smaller the mass / weight / size of a mammal the higher / faster / smaller is its heart rate (or vice versa) / ORA ;</td><td>[1]</td><td></td></tr>
<tr><td>(c)</td><td>
<table>
<tr><th>label</th><th>component name</th><th>function of component</th></tr>
<tr><td>F</td><td>red (blood) cell ;</td><td>transports oxygen / O_2 ;</td></tr>
<tr><td>G</td><td>white (blood) cell ;</td><td>antibody formation / phagocytosis / kills bacteria or pathogens / AW;</td></tr>
<tr><td>H</td><td>plasma ;</td><td>transport of blood cells / soluble nutrients / hormones / urea / carbon dioxide / plasma proteins / heat;</td></tr>
</table>
</td><td>[6]</td><td>function must match component, but if component is incorrectly named, and the function given for it is a correct one, allow 1 mark</td></tr>
</table>

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(d)	label line to aorta ; label line to hepatic portal vein ;	[2]	
(e)	more muscle contraction / muscle activity (in exercise) ; more energy required ; more respiration (occurs) ; more oxygen / oxygenated blood / glucose / sugar needed (by muscle cells) ; more carbon dioxide / heat produced ; (and so) more blood pumped round body / blood pumped round body faster;	max [3]	"more" (AW such as "increased") must be mentioned at least once in the account – if not, max = 2
		[Total: 17]	
3 (a)	tick ; cross / blank tick ; cross / blank tick ; cross / blank	[3]	
(b)	condom / sheath / femidom ; virus / HIV contained in sperm / semen / body fluids ; (thin rubber bag catches sperm / semen / fluids) virus cannot get into contact with partner / AW ;	[1] [2]	

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(c) (i)	no intercourse / AW around ovulation time / fertile time / day 12 – 17 / fertile period / ORA ; detected by change in female body temperature / changes in vaginal mucus / dates if menstruation is regular ;	[2]	
(ii)	religious or moral reasons / lack of money / lack of availability of other methods / lack of medical advice / AVP ;	[1]	
		[Total: 9]	
4 (a)	**A** = respiration / excretion / decay / decomposition / rotting / AW ; **B** = photosynthesis ; **C** = feeding / nutrition / eating ; **D** = respiration / excretion decay / decomposition / rotting / AW ;	[4]	
(b) (i)	glucose / fat / protein / amino acid / starch / AVP ;	[1]	
(ii)	glucose / fat / protein / amino acid / glycogen / AVP ;	[1]	

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(c)	(body) rotted / decayed / decomposed / action of decomposers / AW ; bacteria / fungi / saprophytes / saprotrophs / microbes ; carry out respiration on / gain energy from / use body as food / AW / equation for respiration (words or symbols) ; as result of respiration (carbon dioxide released) as waste product / excreted ; **OR** body eaten by carnivores ; digested / absorbed ; (carnivore) cells carry out respiration / respiration equation ; as a result of respiration (carbon dioxide) released as waste / excreted ; **OR** body decomposed / rotted / AW ; (the) nutrients absorbed from soil by plants / AW ; plants respire using (this) nutrients / respiration equation ; as a result of respiration (carbon dioxide released) as waste / excreted ;	max [3]	
(d)	deforestation / AW ; respiration ; burning (fossil) fuels / named example ; driving vehicles / AW / generating electricity / factories / industrialisation / AW ;	[2]	
		[Total: 11]	

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5 (a)	<table><tr><td>cuticle</td><td>waterproofs the leaf ;</td></tr><tr><td>stoma</td><td>allows gaseous exchange with surroundings ;</td></tr><tr><td>palisade cell</td><td>produces glucose ;</td></tr><tr><td>phloem tissue</td><td>transports sucrose out of the leaf ;</td></tr><tr><td>spongy mesophyll</td><td>allows diffusion of gases within the leaf ;</td></tr></table>	[4]	5 correct = 4 3 or 4 correct = 3 2 correct = 2 1 correct = 1
(b)	transport of minerals / ions / named mineral or ion (into the leaf) ; support / AW ;	[2]	**R** – nitrogen
(c)	starch / sucrose ;	[1]	
(d)	evaporation of water ; from the surfaces of mesophyll (leaf) cells ; (followed by) loss of water vapour ; out of stomata / stoma ;	[2]	
		[Total: 9]	

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6 (a)	**P** ; **M** ; **L** ;	[3]	
(b)	*colon:* absorption of water ; AVP (e.g. absorption of Vitamin K produced by intestinal flora) ; *pancreas:* secretion / production of / AW enzymes / amylase / protease / lipase ; production of alkaline secretions to neutralise stomach acid ; accept secretion of insulin / glucagon ; *stomach:* storage of food ; digestion / chemical digestion / mechanical digestion / AW ; production of (gastric) protease / digestion of proteins ; sterilisation of food (by hydrochloric acid) ;	max [1] max [1] max [1]	
(c) (i)	line labelled **X** ending on the liver / "X" on liver ;	[1]	
(ii)	emulsification / breaks down / break up large fat globules to smaller ones / AW ;	[1]	
(iii)	increases surface area (of fat globules) ; enzyme / lipase (can digest it more rapidly) ;	[2]	

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	(d)	diffusion / description of ; active transport / description of ; digested food / named example passes into blood / capillary / villi ; surface area increased by villi / AW ;	max [3]	**R** – reference to cilia
			[Total: 13]	
7	**(a)**	direction of energy transfer / flow / movement (through the food web) ;	[1]	
	(b)	grass ; bird / snake / lizard ; 2 ; 4 ;	[4]	
	(c)	hawk ; snake ;	max [1]	
			[Total: 6]	

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8 (a) (i)	meiosis ;	[1]	**I** – words that are a cross between meiosis and mitosis (e.g. meiotosis or any word containing a "t")
(ii)	(gametes) are haploid / n / contain 1 set of chromosomes / contain half the number of chromosomes / ORA ;	[1]	**I** – numbers of chromosomes
(b)	male = X Y (or vice versa) ; female = X X ;	[2]	**R** – if both answers identical use judgement if letters appear indeterminate
(c) (i)	(two or more) alternative / different forms of a gene / AW ;	[1]	**I** – (different) type / copy / sort / kind
(ii)	Bb × Bb ; B and b × B and b ; BB + Bb + Bb + bb (any order so long as correct re "lines") ; black + black + black + white (or different order to match genotypes ; 3 black : 1 white ;	[5]	allow ecf if a mistake is made, but each line must correspond to the previous one at each stage
(d)	Bb ;	[1]	accept bB
		[Total: 11]	
		[Paper Total 80]	

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