CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2013 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.

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.

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 or inadequate
- **ecf** error carried forward
- **AW** alternative wording (where responses vary more than usual)
- **AVP** alternative valid point
- **ORA** or reverse argument
- **OWTTE** or words to that effect
- 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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	Answer	Marks	Guidance for Examiners
1 (a)	insects; 3 pairs of / six legs / 3 regions to body / wings; arachnids; 4 pairs of / eight legs; myriapods; 1 or two pairs of identical legs on each segment; Any two pairs – 2 marks each	[max 4]	A – head, thorax, abdomen named I – Refs to individual organisms but if in an arthropod group allow correct feature for the group
(b)	1 to be out of sight; to avoid predators / less likely to be eaten; 2 it is damper; to avoid drying out / keep gills moist; 3 it is cooler; avoids drying out; 4 to be out of the sun; avoids UV light; 5 is herbivore / eats plants / source of food; (feeds on) decaying vegetation; Any two pairs – 2 marks each	[max 4]	A – desiccation A – temperature changes less A – metabolism more constant A – rotting
		[Total: 8]	

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<table>
<tr><td>2</td><td>
<table>
<tr><td>substance</td><td>how inspired air is different from expired air</td></tr>
<tr><td>carbon dioxide</td><td>less in inspired air;</td></tr>
<tr><td>dust particles</td><td>more in inspired air;</td></tr>
<tr><td>oxygen</td><td>more in inspired air;</td></tr>
<tr><td>water vapour</td><td>less in inspired air;</td></tr>
</table>
</td><td>[4]</td><td>A – ORA if specify reverse comparison
No credit for absolutes for oxygen, carbon dioxide, water vapour</td></tr>
<tr><td></td><td></td><td>[Total: 4]</td><td></td></tr>
<tr><td>3 (a)</td><td>label A
plasma;
transports / carries food materials;

label B
white blood cell;
engulfs bacteria / pathogens / produces antibodies;

label C
red blood cell;
transports / carries oxygen;</td><td>[6]</td><td>A – transports carbon dioxide, urea, hormones, blood cells, named food materials

A – leucocytes, phagocytes, lymphocytes</td></tr>
<tr><td>(b)</td><td>platelets;
help to form clots / prevent bleeding;</td><td>[2]</td><td>A – plaquettes</td></tr>
<tr><td></td><td></td><td>[Total: 8]</td><td></td></tr>
</table>

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4 (a) (i)	three bars plotted correctly;	[1]	
(ii)	working - add totals; deduct from 100;	[max 2]	17 + 7 + 17 = 41 100 – 41 = 59% Correct answer but no working shown = 2 marks
(iii)	prostate (cancer);	[1]	
(b) (i)	1 exercise (regularly); 2 reduce / stop smoking; 3 reduce (animal / saturated) fat / cholesterol in diet; 4 lose weight / avoid obesity; 5 reduce salt intake; 6 reduce alcohol intake; 7 avoid stress situations; 8 correct ref to medication;	[max 3]	I – refs to balanced diet
(ii)	drinking a lot of alcohol / binge drinking / drug abuse;	[1]	A – heroin use
		[Total: 8]	

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5 (a) (i)	1 (emmer) has smaller ears (than modern wheat); 2 (emmer) grains are smaller (than modern wheat); 3 (emmer) has fewer grains per ear (than modern wheat); 4 (emmer) grains have an awn (but not modern wheat);	[max 2]	Assume answer refers to emmer unless specifically stated otherwise A – description of awn as bristle, hair etc.
(ii)	(artificial) selection / selective breeding;	[1]	
(b)	wind (pollination); has exposed anthers / stamens / OWTTE; has feathery / exposed stigma / OWTTE;	[3]	
(c) (i)	(aerobic) respiration;	[1]	R – anaerobic A – oxidation
(ii)	oxygen;	[1]	
(iii)	carbon dioxide;	[1]	
(iv)	1 high temperature kills grains / embryo; 2 high temperature denatures enzymes; 3 lack of oxygen kills grains / embryo; 4 accumulation of carbon dioxide kills / poisons grains / embryo; 5 high temperature kills bacteria / fungi (so no decay); 6 lack of water (prevents germination / decay);	[max 3]	A – ref to 80 °C A – lack of air
		[Total: 12]	

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6	DNA; genes; alleles; haploid; chromosomes; gametes;	[6]	
		[Total: 6]	

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7 (a) (i)	combustion – E; photosynthesis – C; respiration – A / B / D;	[3]	
(ii)	1 it could cause a rise in world temperatures / global warming; 2 heat energy becomes trapped; 3 causing ice caps to melt; 4 sea levels to rise; 5 flooding (of low lying land); 6 could cause climate change / alter rainfall; 7 affects agriculture / have to grow different crops; 8 affects ecosystems / distribution of plants / animals; 9 affects water supply;	[max 3]	1 A – greenhouse effect 3 A – glaciers, poles 6 A – extreme weather conditions
(b) (i)	four organisms in suitable sequence; joined by arrows in correct direction;	[2]	grass, gazelle, ticks, oxpecker bird grass → gazelle → ticks → oxpecker bird
(ii)	the flow of energy (between organisms);		
(iii)	1 the energy in the food chain is lost; 2 as heat; 3 it cannot be reused (by living organisms); 4 carbon (dioxide) can be reused (in photosynthesis);	[max 3]	A – energy cannot be reused / not returned to start of chain again
		[Total: 12]	

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8 (a)	female – XX; male – XY;	[2]	
(b)	parent female male parent chromosomes XX XY gametes X X X Y; offspring chromosomes XX XY XX XY; offspring female male female male;	[3]	NO MARK for parent chromosomes Gametes ECF from parent chromosomes. Continue marking in logical sequence
		[Total: 5]	

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9 (a)	1 enzymes are proteins; 2 act as (biological) catalysts; 3 speed up / alter the speed of chemical reactions; 4 not changed by the reaction;	[max 2]	4 A – can be used over and over again
(b)	1 Benedict's reagent / solution; 2 ref to crushing food to be tested 3 heat food / material with reagent; 4 to at least 70 °C; 5 if colour changes from blue to red reducing sugar present;	[max 3]	4 A – boiling 5 A – green, yellow, orange
(c) (i)	8.6 +/– 0.2;	[1]	
(ii)	1 increasing the pH increase lactase / enzyme activity (up to a peak); 2 (beyond peak) as pH rises further the lactase activity decreases; 3 no activity below pH 4 / above pH 13 / only active between pH 4 and 13;	[3]	
(d)	1 break food up into small pieces (that can be swallowed); 2 increase surface area of food particles; 3 for enzyme activity;	[max 2]	1 I – molecules 3 A – named digestive enzyme
		[Total: 11]	

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10 (a) (i)	in palisade cells / in chloroplasts;	[1]	A – chlorophyll / (upper / spongy) mesophyll
(ii)	*(water* +) carbon dioxide; (*oxygen* +) sugar / glucose;	[2]	mark is for carbon dioxide mark is for sugar / glucose A – starch
(b)	1 water enters root hairs (cells); 2 by osmosis; 3 through partially permeable cell membrane; 4 from high (water) concentration to low concentration / down (water) concentration gradient;	[max 3]	2 A – by diffusion
		[Total: 6]	

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