CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 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 number	Mark Scheme	Mark	Guidance
1	**A** – hoverfly ; **B** – (clouded yellow) butterfly ; **E** – (large yellow) moth ; **F** – springtail ;	[4]	
		[Total: 4]	
2 (a) (i)	body temperature high / above normal AW ;	[1]	
(ii)	sweat secreted AW / sweat glands active ; (sweat / water) evaporates (from skin surface) ; heat / energy for evaporation provided by body ; body cools down ;	max [2]	**A** ecf if 2(a)(i) answered incorrectly
(iii)	blood carries heat AW ; body temperature needs to be maintained AW at 37 °C / reference to homeostasis ; idea of enzyme activity affected adversely by higher temperature ; (more blood flow to the surface) means more heat lost ; by evaporation of sweat / conduction / convection / radiation ;	max [2]	
(b)	33 (°C) ;	[1]	

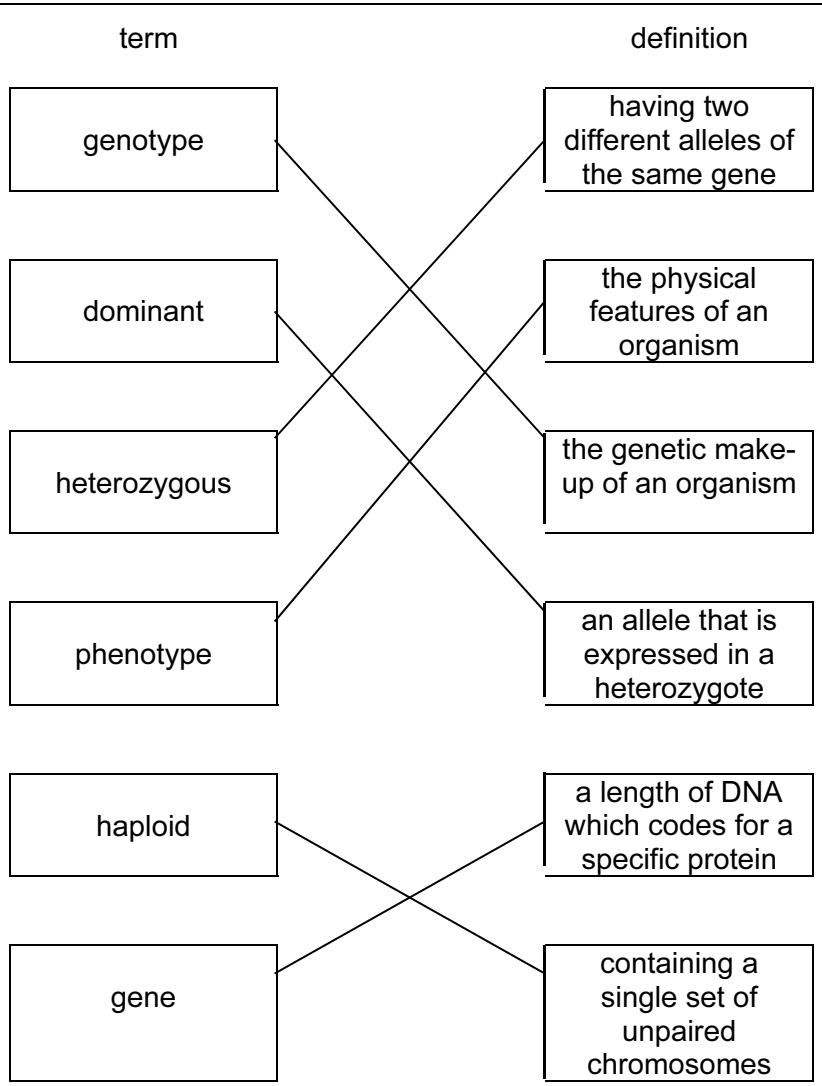
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Question number	Mark Scheme	Mark	Guidance
(c)	(in exercise) muscles contract / work AW ; muscles respire ; (so) release energy (for contraction); energy is "lost" as heat ; idea of (body temperature slightly raised) as blood takes time to transport the heat to the body surface / skin ;	max [2]	"more" (or equivalent) must be used at least once in the explanation otherwise max 1 **ignore** body more active / respires more
		[Total: 8]	
3 (a) (i)	arrow to point from heart to lungs ;	[1]	
(ii)	**A** – renal artery ; **B** – hepatic vein ; **C** – pulmonary artery ;	[3]	
(iii)	line joining alimentary canal to liver ; hepatic portal vein ;	[2]	

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<table>
<tr><th>Question number</th><th>Mark Scheme</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>(b)</td><td>
<table>
<tr><td>characteristic</td><td colspan="3">blood vessel</td></tr>
<tr><td></td><td>aorta</td><td>vena cava</td><td>capillary</td></tr>
<tr><td>thick, elastic wall</td><td>yes</td><td>no</td><td>no ;</td></tr>
<tr><td>valves present along length</td><td>no</td><td>yes</td><td>no ;</td></tr>
<tr><td>transports oxygenated blood</td><td>yes</td><td>no ;</td><td>no</td></tr>
<tr><td>amino acids pass through walls</td><td>no</td><td>no</td><td>yes ;</td></tr>
</table>
</td><td>[4]</td><td>one mark for each correct row</td></tr>
<tr><td>(c) (i)</td><td><u>coronary</u> artery ;</td><td>[1]</td><td></td></tr>
<tr><td>(ii)</td><td>cholesterol / fat / lipid ;</td><td>[1]</td><td>A thrombus / clot;
ignore fatty acids / fatty foods / blood</td></tr>
<tr><td>(iii)</td><td>blockage stops blood flow AW ;
oxygen / glucose / nutrients would not reach muscle ;
muscle cannot respire ;
runs out of energy ;
muscle cells die ;
more muscle dies than in previous attack ;
heart / ventricle cannot contract effectively / cannot pump blood ;</td><td>max [3]</td><td>A heart tissue / heart muscle throughout but
ignore heart unqualified</td></tr>
<tr><td></td><td></td><td>[Total: 15]</td><td></td></tr>
</table>

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Question number	Mark Scheme	Mark	Guidance
4 (a)		[5]	**R** if more than one line from each LH box 5 or 6 correct = 5 4 correct = 4 3 correct = 3 2 correct = 2 1 correct = 1

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Question number	Mark Scheme	Mark	Guidance
(b) (i)	cell division to give (two / identical) cells;	[1]	
(ii)	asexual reproduction; growth of tissues AW; development of new structures; replacement of cells; example of mitosis occurring (e.g. in embryo / skin cells) ;	max [2]	**A** cancer
(c) (i)	*(XX and XY)* **X X** **X Y** ; **XX XX XY XY** ;	[2]	both pairs needed in correct sequence for 1 mark four needed in any order for 1 mark, but must be correct sequence if lines drawn
(ii)	50% / 0.5 / ½ / 2 in 4 / 1 in 2 / 1:1;	[1]	
(iii)	**M** placed between line drawn above mother and father and line above gamete circles ;	[1]	
		[Total: 12]	
5 (a) (i)	incisor ;	[1]	

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Question number	Mark Scheme	Mark	Guidance
(ii)	**K** – enamel; **L** – dentine; **M** – root; **N** – pulp (cavity);	[4]	
(b)	bacteria (in the mouth) ; respire or feed on sugar or food / form plaque ; anaerobic (respiration) ; produce AW acid ; acid destroys AW enamel ; (idea of) bacteria access internal structure via hole made ;	max [3]	**ignore** bacteria attacking AW the enamel acid production mark must follow from explanation
		[Total: 8]	
6 (a) (i)	10 (years);	[1]	
(ii)	0–4 years; 12–20 years;	[2]	either order **ignore** if years not given

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Question number	Mark Scheme	Mark	Guidance
(iii)	increase ; more rapid / faster AW ; calculation from figures from Fig. 6.1 in support ; (14–20 years is) time of adolescence / puberty / start of the menstrual cycle ; sex hormones stimulate development / growth or growth of named reproductive organ ; named sex hormone; max [3]		**ignore** growing up / getting ready to have children testosterone / oestrogen / progesterone **A** growth hormone
(b) (i)	poor development of bones / teeth / weak or brittle bones / rickets or osteoporosis or osteopenia [1]		**ignore** poor development in general **A** fetus takes calcium from maternal bones
(ii)	low birth weight ; poor brain development ; addicted to nicotine / withdrawal symptoms / irritable baby ; AVP ; max [1]		**R** blood contains tar / lungs under-developed / respiratory conditions **ignore** poor development of baby e.g. low oxygen concentration in the blood at birth
		[Total: 8]	

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Question number	Mark Scheme	Mark	Guidance
7 (a) (i)	*from left:* photosynthesis; respiration; feeding; decomposition / respiration;	[4]	
(ii)	glucose + oxygen ; ⟶ carbon dioxide + water ;	[2]	**R** if energy given on LHS **ignore** if energy given on RHS If chemical equation is given it must be correct and balanced = 2 mark / 1 mark per "side" **ignore** mixed chemical and word equation

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Question number	Mark Scheme	Mark	Guidance
(iii)	eutrophication ; fertilisers dissolve in rain / water ; run-off / AW into streams / lakes / sea ; (fertilisers provide) nutrients / nitrates / phosphates ; (for) algae to grow rapidly / reproduce ; oxygen (in the water) depleted AW / algae use more oxygen ; aquatic plants die (as short of oxygen / light) ; dead plants decomposed / respired by bacteria ; (increased) oxygen shortage ; animals / named animals die ; aquatic food chains destroyed / affected ;	max [4]	first marking point is “stand alone” other mark points must be given in a logical sequence, but stages may be omitted **ignore** if animals die for wrong reason

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Question number	Mark Scheme	Mark	Guidance
(b)	death of animals and plants / loss of medicinal chemicals ; migration of animals / spread of animal borne diseases ; species extinction / loss of habitat / loss of biodiversity ; disruption of food chains ; less photosynthesis ; increase in carbon dioxide concentration ; global warming / rising sea levels / ice caps melt ; loss of soil / soil erosion / landslides / soil not stabilised by roots ; flooding ; changes to water cycle / weather patterns / desertification ; AVP ;	max [3]	**ignore** reduction in oxygen concentration **ignore** reference to ozone layer / acid rain
(c) (i)	3 units + 2 units = 5 units 5 / 20 units ; 25(%) ;	[2]	correct answer with no working gets 2 marks

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<table>
<tr><th>Question number</th><th>Mark Scheme</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>(ii)</td><td>contains sewage / chemical in sewage / minerals / harmful bacteria / parasites / pathogens ;

contains (harmful cleaning) chemicals / named chemical / drugs / hormones ;

pH of water is too low ;</td><td>max [1]</td><td>idea that these need to be removed / treated</td></tr>
<tr><td>(iii)</td><td>(vitamin) C;</td><td>[1]</td><td>A ascorbic acid</td></tr>
<tr><td></td><td></td><td>[Total: 17]</td><td></td></tr>
<tr><td>8 (a) (i)</td><td>villus ;</td><td>[1]</td><td>A villi</td></tr>
<tr><td>(ii)</td><td>absorption ;</td><td>[1]</td><td>A increase the surface area</td></tr>
<tr><td>(b)</td><td>
<table>
<tr><th>food type</th><th>enzyme involved in digestion</th><th>products of digestion</th></tr>
<tr><td>starch</td><td>amylase / carbohydrase ;</td><td>simple sugar</td></tr>
<tr><td>fat</td><td>lipase ;</td><td>fatty acids and glycerol ;</td></tr>
<tr><td>protein</td><td>protease;</td><td>amino acids ;</td></tr>
</table>
</td><td>[4]</td><td></td></tr>
</table>

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Question number	Mark Scheme	Mark	Guidance
(c)	synthesis of proteins / enzymes / other chemicals ; breakdown / deamination (of amino acids) ; (resulting in) urea formation ; (residue of amino acid molecule) used for energy / respired ; AVP ;	max [2]	
		[Total: 8]	

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