Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/31**

Paper 3 Theory (Core) **May/June 2018**

MARK SCHEME

Maximum Mark: 80

Published

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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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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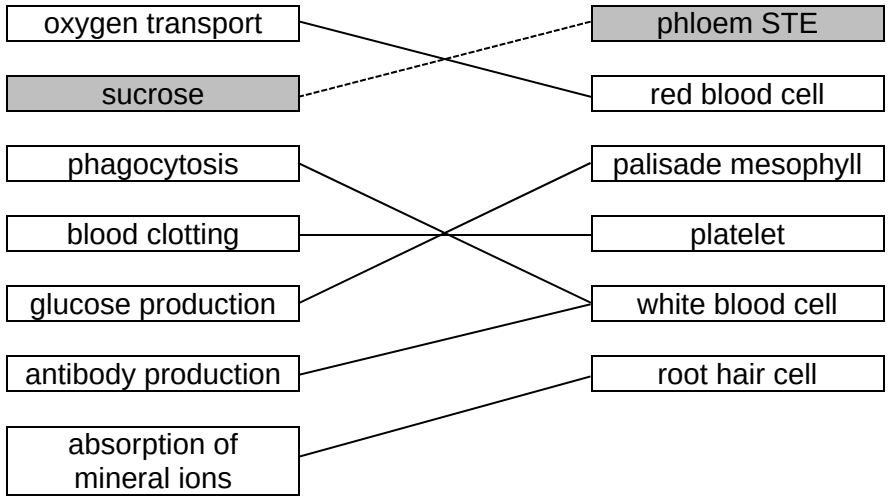
GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however**;** the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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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	Answer	Marks	Guidance
1(a)		**6**	one mark for each correct line deduct one mark for each extra line drawn
1(b)(i)	line ending on a guard cell labelled **G ;** line ending in a stoma labelled **S ;**	**2**	
1(b)(ii)	gas exchange / diffusion of gases / for transpiration / movement of correct substance in correct direction described **;**	**1**	

Question	Answer	Marks	Guidance
2(a)	fusion of the nuclei of two gametes / AW **;** to form a zygote **;** production of genetically different offspring **;**	**3**	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2(b)(i)</td><td>
<table>
<tr><th>letter</th><th>name of tube</th><th>name of substance or substances transported</th></tr>
<tr><td>A</td><td>rectum / colon / large intestine ;</td><td>faeces</td></tr>
<tr><td>B</td><td>sperm duct ;</td><td>sperm</td></tr>
<tr><td>C</td><td><u>urethra</u> ;</td><td>sperm and urine</td></tr>
<tr><td>D</td><td><u>ureter</u> ;</td><td>urine</td></tr>
</table>
</td><td>4</td><td></td></tr>
<tr><td>2(b)(ii)</td><td>line labelled P ending on prostate gland ;</td><td>1</td><td></td></tr>
<tr><td>2(c)</td><td>protects / holds / contains, testis
or
idea of maintains testes at <u>lower</u> temperature (than that of body) ;</td><td>1</td><td></td></tr>
</table>

Question	Answer	Marks	Guidance
3	nervous ; motor ; impulses ; synapses ; fast ;	**5**	

Question	Answer	Marks	Guidance
4(a)	(reactants) glucose + oxygen ; (products) carbon dioxide + water ;	**2**	

Question	Answer	Marks	Guidance
4(b)(i)	6200 (kJ per day) **;**	**1**	
4(b)(ii)	(for male) energy input is, (too) low / below needs **;** loss of weight / thin **;** normal growth, would cease / be reduced **;** fatigue / tired / weak / less active / AW **;** *idea of* more susceptible to infection / disease **;**	**2**	**A** (8000 kJ) is correct for 11 year-old female **I** becomes ill unqualified
4(c)	1 17 year olds require more energy than inactive adults / inactive adults require less energy than 17 year olds **;** 2 17 year olds require less energy than active adults / active adults require more energy than 17 year olds **;** 3 comparative data quote with correct units in support of correct statements for mp1 or mp2 **;**	**3**	Comparison must be between 17 year-old and one of the adult groups.
4(d)	bread / baking / making dough rise **;** brewing / producing alcohol **;** biofuels production / use of alcohol as a fuel **;** AVP **;**	**2**	

Question	Answer	Marks	Guidance
5(a)	food chain starting with fig tree **and** ending with hawk **;** caterpillar before blackbird **;** three correct arrows **;**	**3**	fig tree → caterpillar → blackbird → hawk = 3
5(a)(ii)	(the) Sun **;**	**1**	
5(a)(iii)	decomposer(s) **;**	**1**	
5(b)(i)	1 habitat destruction **;** 2 hunting / poaching (of animals) **;** 3 introduction of new, species / predator **;** 4 lack of food **;** 5 (named) pollution **;** 6 climate change / global warming **;** 7 disease **;** 8 hard to find a mate / AW **;** 9 more predators **;**	**4**	**A** deforestation **A** collecting, plants / animals

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Question	Answer	Marks	Guidance
5(b)(ii)	monitoring / protecting, species **;** remove predators **;** remove vectors of disease **;** protecting / preserving / making new, habitats **;** education **;** captive breeding **;** seed banks **;** DNA banks **;** zoos / wild life parks / conservation areas **;** preserved embryos **;** banning hunting **;**	**1**	**A** AW throughout

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Question	Answer	Marks	Guidance
6(a)	*F:* enamel **;** *G:* dentine **;** *H:* (named) blood vessel / nerve / pulp (cavity) **;**	**3**	
6(b)(i)	bite / tear / cut / hold / rip **;** chewing / grinding / crushing / producing small(er) pieces / mechanical digestion **;** increases surface area (of food) **;** killing prey / defence / cleaning fur **;**	**2**	
6(b)(ii)	produces small pieces of food **;** increases surface area **;** easier to swallow food **;**	**2**	

Question	Answer	Marks	Guidance
7(a)(i)	labelled line to one ovule **;** labelled line to petal **;**	**2**	
7(a)(ii)	carpel / ovary **;** sepal **;**	**2**	
7(b)	line from the anther of one flower **;** line to stigma of another flower **;**	**2**	

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Question	Answer	Marks	Guidance
7(c)	(large) petals **;** stamens / anthers / filaments, inside flower **or** short, stamens / filaments **or** small anthers **;** stigma inside flower / short style **;** stigma, broad / wide / not feathery / AW **;**	**2**	**I** features that are not visible on Fig. 7.1
7(d)	1 ref. to root hair (cell) **;** 2 across cortex **;** 3 ref. to xylem **;** 4 moves up the stem **;** 5 (into) mesophyll (cells) **;** 6 AVP **;** e.g. osmosis / diffusion , ref. to transpiration	**4**	must be in correct order

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Question	Answer	Marks	Guidance
8	<table><tr><th>food type</th><th>enzyme acting on the food type</th><th>simpler chemicals produced</th></tr><tr><td>protein</td><td>protease</td><td>amino acids ;</td></tr><tr><td>starch ;</td><td>amylase</td><td>glucose / sugar ;</td></tr><tr><td>fats ;</td><td>lipase ;</td><td>fatty acids and glycerol</td></tr></table>	**5**	**A** (poly)peptides **A** maltose **A** lipids / oils

Question	Answer	Marks	Guidance
9(a)(i)	02:00 **and** 05:00 ;	**1**	
9(a)(ii)	11 (arbitrary units) ;	**1**	**A** 10.8 to 11.1
9(a)(iii)	sunrise / light is present ; carbon dioxide, absorbed / used ; (for) photosynthesis ; photosynthesis is using carbon dioxide faster than respiration can provide it ;	**3**	 **A** photosynthesis is faster than respiration
9(b)	rain ; wind ; humidity ; temperature ; shade / clouds / time of year ;	**2**	

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Question	Answer	Marks	Guidance
10(a)	Merino **;** it has, good wool yield / good meat yield / very good wool quality **;**	**2**	
10(b)	use Awassi and Merino sheep **;** breed / cross / mate (together) **;** pick / select / choose, the offspring with required characteristics **;** allow these (chosen) offspring to breed **;** breed the (chosen) offspring with Awassi / Merino sheep **;** repeat for (many / several) generations **;**	**4**	

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