Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/31**

Paper 3 Theory (Core) **October/November 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.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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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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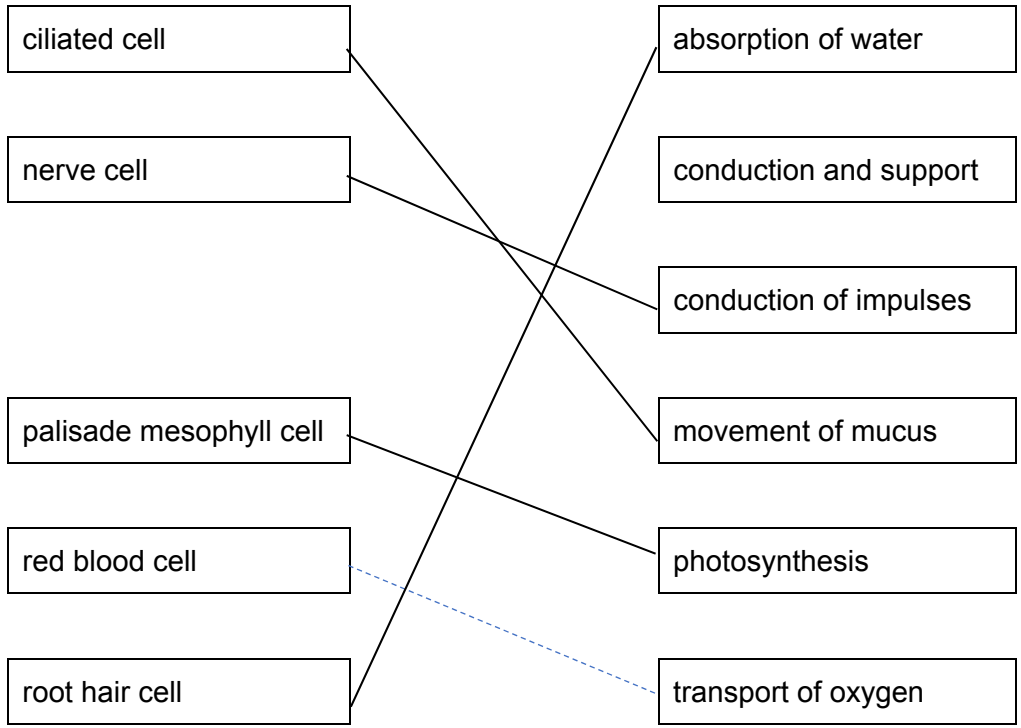
Mark scheme abbreviations

- **;** separates marking points
- **/** alternative responses for the same marking point
- **R** reject the response
- **A** accept the response
- **I** ignore the response
- ecf error carried forward
- AVP any valid point
- ora or reverse argument
- AW alternative wording
- underline actual word given must be used by candidate (grammatical variants excepted)
- ( ) the word / phrase in brackets is not required but sets the context

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(a)</td><td>C ;
B ;
A ;</td><td>3</td><td></td></tr>
<tr><td>1(b)(i)</td><td>ovary ;</td><td>1</td><td></td></tr>
<tr><td>1(b)(ii)</td><td>in plasma / in the blood ;</td><td>1</td><td></td></tr>
<tr><td>1(c)(i)</td><td><table><tr><th>sexual secondary characteristic</th><th>boy</th><th>girls</th></tr><tr><td>breasts grow</td><td></td><td>✓</td></tr><tr><td>growth of sex organs</td><td>✓</td><td>✓</td></tr><tr><td>growth of pubic hair</td><td>✓</td><td>✓</td></tr><tr><td>start of menstruation</td><td></td><td>✓</td></tr><tr><td>voice deepens</td><td>✓</td><td></td></tr></table>;;;;</td><td>4</td><td>1 mark for each correct row

I tick in girls</td></tr>
</table>

Question	Answer	Marks	Guidance
1(c)(ii)	 ;;;;	**4**	one mark for each correct line

Question	Answer	Marks	Guidance
2(a)	light is needed for (photosynthesis) / AW ; carbon dioxide, is needed / increases rate (of photosynthesis) / AW **or** *idea of* no / low, carbon dioxide results in, low rate of photosynthesis / few bubbles ;	**2**	
2(b)	*test 2:* (the results) stay the same / no (oxygen) bubbles (are, released / produced) ; no photosynthesis ; (because) no light ; *test 3:* (the number of oxygen) bubbles increase ; (because) more photosynthesis / increases rate of reaction ; enzymes more active / correct ref. to increased energy ;	**4**	max 2 for each test **A** no carbon dioxide **A** less bubbles in the context of temperature being too high for aquatic plants so enzymes not working **A** decreased solubility of carbon dioxide
2(c)	is the movement of substances from high to low concentration ; occurs due to the random movement of particles ;	**2**	

Question	Answer	Marks	Guidance
3(a)(i)	running ;	**1**	
3(a)(ii)	125 (bpm) ;	**1**	
3(a)(iii)	53 (%) ;	**2**	
3(b)	ECG / listening to valves (closing) ;	**1**	**A** other correct methods
3(c)	breathing rate increases / AW ; breathing depth increases / AW ;	**2**	

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Question	Answer	Marks	Guidance
3(d)	cells ; oxygen ; nutrient ;	**3**	
3(e)(i)	glucose → lactic acid ;	**1**	
3(e)(ii)	releases more energy ;	**1**	

Question	Answer	Marks	Guidance

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>4(a)</td><td>
<table>
<tr><th>name of type of tooth</th><th>letter on Fig. 4.2</th><th>function</th></tr>
<tr><td>canine</td><td>R</td><td rowspan="2">cut / rip / tear / pierce / grip / bite / separate / break into smaller pieces</td></tr>
<tr><td>incisor</td><td>S</td></tr>
<tr><td>molars</td><td>P</td><td>grinding</td></tr>
<tr><td>premolars</td><td>Q</td><td>tearing and grinding</td></tr>
</table>
;;;;</td><td>4</td><td>one mark for each correct row</td></tr>
<tr><td>4(b)(i)</td><td>food left on teeth / AW ;
ref. to bacteria ;
(bacteria) respire sugar ;
(bacteria) produce acid ;
(acid) dissolves, enamel / dentine, / AW ;
AVP ;</td><td>4</td><td></td></tr>
</table>

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Question	Answer	Marks	Guidance
4(b)(ii)	clean teeth / AW **or** ref. to good oral hygiene **;** use a fluoride toothpaste / drink water containing fluoride / AW **;** visits to the, dentist / hygienist / AW **;** eat fewer sugar-containing foods / AW **or** fewer acidic foods or drink **;**	**2**	

Question	Answer	Marks	Guidance
5(a)	72 (%) **;**	**1**	
5(b)	fossil fuels cannot be replaced when they run out / they take millions of years to form / used up faster than they build up / finite supply / AW **;**	**1**	
5(c)(i)	respiration **;** decomposition / decay **;**	**2**	
5(c)(ii)	photosynthesis **;**	**1**	**A** fossilisation / carbon capture (technology)
5(d)	<u>enhanced</u> greenhouse effect **;** global warming / climate change / rise in temperatures **;** named effect of global warming **;**	**2**	e.g. rising sea levels / species extinction / loss of biodiversity / soil erosion / flooding / desertification / loss of habitats

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Question	Answer	Marks	Guidance
5(e)	named technology **;;** description of how it is used **;;** e.g. *fertiliser:* increase productivity / increase yield / addition of (named) nutrients to the soil / nutrients to the plant / increase soil fertility *herbicide:* kills or remove or prevents, unwanted plants or weeds / reduces competition (with weeds) / increases yield *insecticide:* kills or remove or prevents, insects / pests (feeding on the crop) / increases yield**;** *agricultural machinery / techniques:* irrigation / hydroponics / monoculture / greenhouse / polytunnel / less manpower / easier harvesting *selective breeding or artificial selection***;** desirable features e.g. more grains in wheat / disease resistance / small fruit trees / drought resistant *GMO:* named examples – frost or pest resistant / golden rice / soya beans / flavr savr tomatoes	**3**	

Question	Answer	Marks	Guidance
6(a)(i)	fur / hair ;	**1**	
6(a)(ii)	*Panthera ;*	**1**	
6(b)	*scales:* fish / reptiles ; *feathers*: birds ; *gills:* fish ; *smooth moist skin:* amphibians ;	**4**	**A** birds
6(c)	genetic material / DNA ; cytoplasm ; cell membrane ; AVP ;	**2**	

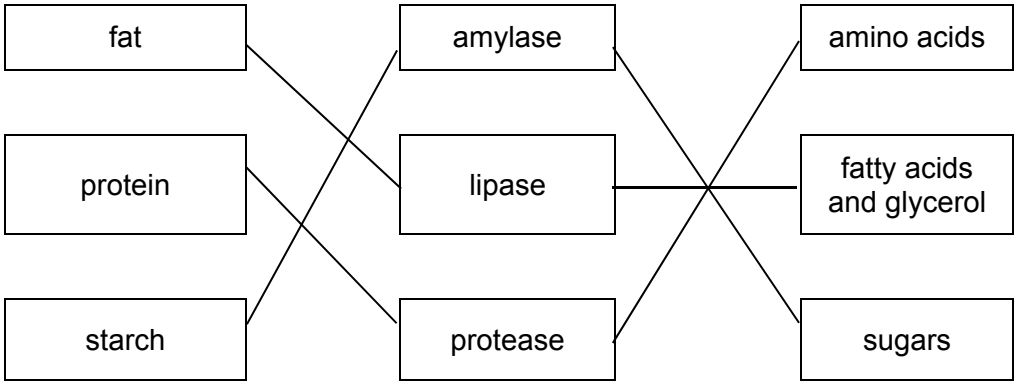
Question	Answer	Marks	Guidance
7(a)(i)	five / 5 ;	**1**	
7(a)(ii)	<u>black</u> (fur / coat) ;	**1**	
7(a)(iii)	homozygous circled ; dominant circled ;	**2**	
7(b)	discontinuous ;	**1**	

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Question	Answer	Marks	Guidance
7(c)(i)	(male and female gametes) **A** and **a ;** (offspring) **AA**, **Aa**, **Aa** and **aa ;** (phenotypic ratio) 3 (white) : 1 (black) **;**	**3**	ecf from the step before <table><tr><td colspan="2" rowspan="2"></td><td colspan="2">male</td></tr><tr><td>**A**</td><td>**a**</td></tr><tr><td rowspan="2">female</td><td>**A**</td><td>**AA**</td><td>**Aa**</td></tr><tr><td>**a**</td><td>**Aa**</td><td>**aa**</td></tr></table>
7(d)	use selective breeding **;** breed / cross / mate, two white goats **;** select offspring with white coats and breed again / do not breed the offspring with black coats **or** remove black goats **;** *idea of* (breeding) over many generations **;** correct ref. to homozygous dominant **;**	**3**	

Question	Answer	Marks	Guidance
8(a)(i)	33 (°C) **;**	**1**	**A** 32 / 34 (°C)
8(a)(ii)	enzymes, destroyed / will not work / become inactive **;**	**1**	**A** denatured **R** killed / die
8(b)	pH **;**	**1**	**A** enzyme / substrate, concentration **A** inhibitors

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Question	Answer	Marks	Guidance
8(c)	 ;;;;;	**5**	6 correct links = 5 4 or 5 correct links = 4 3 correct links = 3 2 correct links = 2 1 correct link = 1