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**BIOLOGY**

**0610/33**

Paper 3 Theory (Core)

**October/November 2019**

MARK SCHEME

Maximum Mark: 80

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**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 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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

This document consists of **13** printed pages.

**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:**

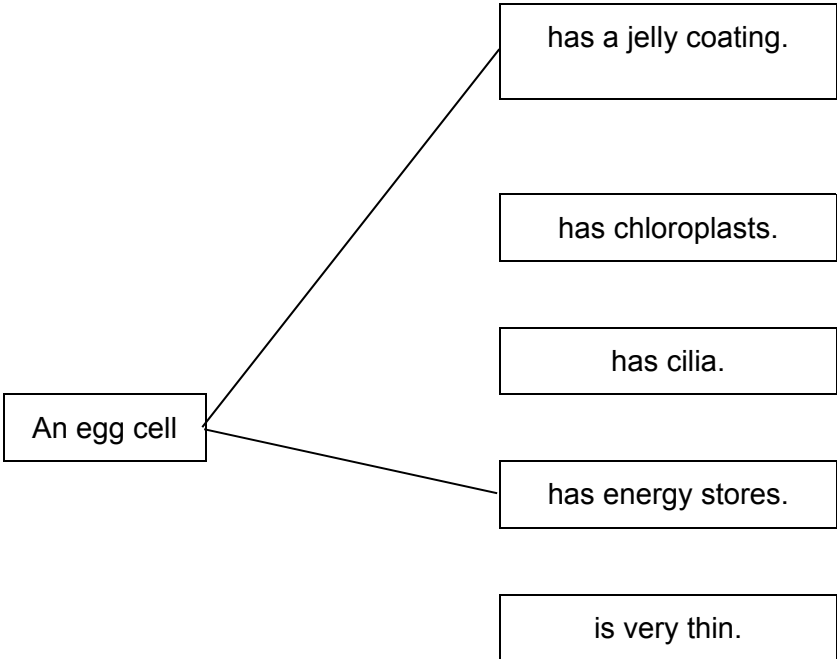
Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

**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.

Question	Answer	Marks	Guidance
1(a)(i)	 <p>An egg cell</p> <ul style="list-style-type: none"> <li>has a jelly coating.</li> <li>has chloroplasts.</li> <li>has cilia.</li> <li>has energy stores.</li> <li>is very thin.</li> </ul>	2	
1(a)(ii)	<p><i>drawing</i> tail drawn onto mid-piece ;</p> <p><i>main features max 2 from:</i> tail / flagellum ; enzymes; nucleus / genetic material / chromosomes ; cytoplasm ; cell membrane ; AVP ;</p>	3	A acrosome

Question	Answer	Marks	Guidance
1(b)(i)	(largest) nucleus (in the middle) chromosome (smallest) gene ;	1	
1(b)(ii)	DNA ;	1	
1(c)	xylem (vessels) ; ciliated (cell) ; palisade (mesophyll cell) ; red blood (cell) ;	4	

Question	Answer	Marks	Guidance
2(a)	sensory (neurone) ;	1	
2(b)(i)	synapse ;	1	
2(b)(ii)	electrical signal ;	1	

Question	Answer	Marks	Guidance												
2(c)	<table border="1"> <tr> <td data-bbox="286 248 1193 320">includes the brain and spinal cord</td> <td data-bbox="1252 248 1346 320">✓ ;</td> </tr> <tr> <td data-bbox="286 384 1193 456">is made up of the brain, heart and spinal cord</td> <td data-bbox="1252 384 1346 456"></td> </tr> <tr> <td data-bbox="286 520 1193 592">consists of the central nervous system only</td> <td data-bbox="1252 520 1346 592"></td> </tr> <tr> <td data-bbox="286 655 1193 727">consists of the central and peripheral nervous system</td> <td data-bbox="1252 655 1346 727">✓ ;</td> </tr> <tr> <td data-bbox="286 791 1193 863">coordinates through the release of hormones</td> <td data-bbox="1252 791 1346 863"></td> </tr> <tr> <td data-bbox="286 927 1193 999">coordinates and regulates body functions</td> <td data-bbox="1252 927 1346 999">✓ ;</td> </tr> </table>	includes the brain and spinal cord	✓ ;	is made up of the brain, heart and spinal cord		consists of the central nervous system only		consists of the central and peripheral nervous system	✓ ;	coordinates through the release of hormones		coordinates and regulates body functions	✓ ;	3	
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2(d)	carbon, hydrogen, oxygen ; nitrogen ;	2													

Question	Answer	Marks	Guidance
2(e)	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>large molecule</b></p> <div style="border: 1px solid black; padding: 5px; margin: 5px; width: 150px;">cellulose</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; width: 150px;">fat</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; width: 150px;">glycogen and starch</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; width: 150px;">protein</div> </div> <div style="text-align: center;"> <p><b>smaller molecule</b></p> <div style="border: 1px solid black; padding: 5px; margin: 5px; width: 150px;">amino acids</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; width: 150px;">fatty acids and glycerol</div> <div style="border: 1px solid black; padding: 5px; margin: 5px; width: 150px;">glucose</div> </div> </div> <pre> graph LR     subgraph LargeMolecules     C[cellulose]     F[fat]     GS[glycogen and starch]     P[protein]     end     subgraph SmallerMolecules     AA[amino acids]     FAG[fatty acids and glycerol]     G[glucose]     end     C --- G     F --- FAG     GS --- G     P --- AA                     </pre> <p style="text-align: right;">♦♦♦ ♦♦♦</p>	<b>4</b>	

Question	Answer	Marks	Guidance																					
3(a)	microscope ; membrane ; nucleus ; wall ; vacuole ; respiration ;	<b>6</b>																						
3(b)(i)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">feature</th> <th style="width: 25%;">mitosis</th> <th style="width: 25%;">meiosis</th> </tr> </thead> <tbody> <tr> <td>produces gametes</td> <td>(✓)</td> <td>✓</td> </tr> <tr> <td>produces genetically different cells</td> <td></td> <td>✓</td> </tr> <tr> <td>produces genetically identical cells</td> <td>✓</td> <td></td> </tr> <tr> <td>produces new cells during growth and repair to damaged tissues</td> <td>✓</td> <td></td> </tr> <tr> <td>replaces cells</td> <td>✓</td> <td></td> </tr> <tr> <td>used in asexual reproduction</td> <td>✓</td> <td></td> </tr> </tbody> </table>	feature	mitosis	meiosis	produces gametes	(✓)	✓	produces genetically different cells		✓	produces genetically identical cells	✓		produces new cells during growth and repair to damaged tissues	✓		replaces cells	✓		used in asexual reproduction	✓		<b>4</b>	6 correct = 4 marks 4 and 5 correct = 3 marks 2 and 3 correct = 2 marks 1 correct = 1 mark
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3(b)(ii)	<b>X and X ;</b> <b>X and Y ;</b>	<b>2</b>																						



<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
4(a)	differences between individuals ; of the same species ;	<b>2</b>	
4(b)(i)	140 ;	<b>1</b>	
4(b)(ii)	20.0–20.9 (cm) ;	<b>1</b>	
4(c)	<i>type</i> : continuous / phenotypic ; <i>evidence</i> : range of phenotypes / AW ;	<b>2</b>	

Question	Answer	Marks	Guidance				
5(a)(i)	label line pointing to testis ; testes / testis ;	<b>2</b>					
5(a)(ii)	oestrogen ;	<b>1</b>					
5(a)(iii)	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th data-bbox="286 411 779 480">girls only</th> <th data-bbox="779 411 1196 480">boys and girls</th> </tr> </thead> <tbody> <tr> <td data-bbox="286 480 779 620">menstruation begins breasts grow pelvis broadens</td> <td data-bbox="779 480 1196 620">growth of under arm hair growth of pubic hair</td> </tr> </tbody> </table>	girls only	boys and girls	menstruation begins breasts grow pelvis broadens	growth of under arm hair growth of pubic hair	<b>3</b>	5 correct = 3 marks 4 or 3 correct = 2 marks 2 or 1 correct = 1 mark
girls only	boys and girls						
menstruation begins breasts grow pelvis broadens	growth of under arm hair growth of pubic hair						
5(b)	increased rate of breathing ; increased, pulse / heart, rate ; widening of pupils ; AVP ; e.g. more glucose in blood / more alert	<b>2</b>					

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
6(a)(i)	(chemical reactions in cells that) break down of nutrient molecules to release energy ; without using oxygen ;	<b>2</b>	
6(a)(ii)	lactic acid ;	<b>1</b>	
6(a)(iii)	produces carbon dioxide ; produces alcohol ;	<b>2</b>	
6(b)(i)	24 (:1) ;;	<b>2</b>	
6(b)(ii)	aerobic releases more energy / anaerobic releases less energy ; run faster / run further / less fatigue / AW ; AVP ;	<b>2</b>	
6(c)	140 ;;	<b>2</b>	
6(d)	alveoli ; two(-way) ;	<b>2</b>	

Question	Answer	Marks	Guidance
7(a)(i)	they will grow towards the light / AW ;	1	
7(a)(ii)	phototropism ;	1	
7(a)(iii)	plants make their own food ; light provides energy ; for photosynthesis ; ref. to chlorophyll ; in chloroplasts ; to produce, carbohydrates / glucose / sugars ; (energy) needed for growth ; AVP ;	4	
7(a)(iv)	(roots) grow away from the light ;	1	
7(b)	suitable temperature ; water ; oxygen ;	3	
7(c)	(water absorbed by) osmosis ; vacuole fills with, water / fluid / AW ; pressure (of the water) ; pressing / pushing, outwards on the cell wall ;	2	

Question	Answer			Marks	Guidance																		
8(a)	<table border="1"> <thead> <tr> <th data-bbox="277 247 488 311">name</th> <th data-bbox="495 247 797 311">letter from Fig. 8.1</th> <th data-bbox="804 247 1361 311">function</th> </tr> </thead> <tbody> <tr> <td data-bbox="277 316 488 379">cornea</td> <td data-bbox="495 316 797 379"><b>F</b> ;</td> <td data-bbox="804 316 1361 379">refracts light</td> </tr> <tr> <td data-bbox="277 384 488 448">iris</td> <td data-bbox="495 384 797 448"><b>G</b></td> <td data-bbox="804 384 1361 448">controls how much light enters the pupil</td> </tr> <tr> <td data-bbox="277 453 488 517">retina</td> <td data-bbox="495 453 797 517"><b>A</b> ;</td> <td data-bbox="804 453 1361 517">contains light receptors</td> </tr> <tr> <td data-bbox="277 521 488 585">lens ;</td> <td data-bbox="495 521 797 585"><b>D</b></td> <td data-bbox="804 521 1361 585">focuses light on the retina</td> </tr> <tr> <td data-bbox="277 590 488 646">optic nerve</td> <td data-bbox="495 590 797 646"><b>C</b></td> <td data-bbox="804 590 1361 646">carries impulses to the brain ;</td> </tr> </tbody> </table>	name	letter from Fig. 8.1	function	cornea	<b>F</b> ;	refracts light	iris	<b>G</b>	controls how much light enters the pupil	retina	<b>A</b> ;	contains light receptors	lens ;	<b>D</b>	focuses light on the retina	optic nerve	<b>C</b>	carries impulses to the brain ;			<b>4</b>	
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8(b)	pupil (diameter), gets smaller / constricts ; restricts / reduces / controls, the amount of light entering the eye / AW ; reflex (action) / involuntary action / automatic / protective ;			<b>2</b>																			