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**BIOLOGY**

**0610/32**

Paper 3 Theory (Core)

**March 2017**

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 will not enter into discussions about these mark schemes.

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**Abbreviations used in the Mark Scheme:**

- ; separates marking points
- / alternatives
- I ignore
- R reject
- A accept (for answers correctly cued by the question, or guidance for examiners)
- AW alternative wording
- AVP any valid point
- ecf credit a correct statement / calculation that follows a previous wrong response
- **ora** or reverse argument
- ( ) the word / phrase in brackets is not required, but sets the context
- underline actual words given must be used by the candidate (or grammatical variants of them)

Question	Answer	Marks	Guidance
1	<pre> graph LR     A[salivary glands] --- B[amylase]     C[pancreas] --- D[lipase]     C --- E[protease]     F[glands in stomach lining] --- E           </pre> <p style="text-align: right;">.... ....</p>	4	one mark for each correct line deduct one mark for each extra line drawn
	<b>Total:</b>	<b>4</b>	

Question	Answer	Marks	Guidance
2(a)(i)	A = <u>aorta</u> ; B = <u>pulmonary vein</u> ; C = <u>atrium</u> ; D = <u>ventricle</u> ; E = <u>muscular wall</u> ;	5	
2(a)(ii)	<u>right ventricle</u> ;	1	
2(b)(i)	5 <u>and</u> 32 ; dm <sup>3</sup> per min ;	2	
2(b)(ii)	380 ;;	2	(19 ÷ 5) × 100 = 1 mark
2(b)(iii)	heart beats faster ; heart pumps more blood out per beat/ beats with more force per beat ;	2	

Question	Answer	Marks	Guidance
2(b)(iv)	F is fitter / AW / has a stronger heart / is exercising more vigorously / has a larger body / larger heart / is male ;	1	ora for G
	<b>Total:</b>	<b>13</b>	

Question	Answer	Marks	Guidance
3(a)(i)	<b>H</b> sensory neurone ; <b>J</b> motor neurone ; <b>K</b> relay neurone ;	3	
3(a)(ii)	circle around one of the synapses (on Fig. 3.1) ;	1	I if circle is too large to be specific
3(a)(iii)	rapid / instant / AW ; automatic / involuntary / AW ; co-ordinated ;	2	
3(b)(i)	rapid so that further damage is avoided quickly ; bar dropped before student is aware of pain / danger ; co-ordinated / appropriate muscles involved ; AVP ;	2	A protective
3(b)(ii)	pupil reflex / knee reflex / any valid example described ;	1	
	<b>Total:</b>	<b>9</b>	

Question	Answer	Marks	Guidance
4		5	1 line correct = 1 mark 2 lines correct = 2 marks 3 lines correct = 3 marks 4 or 5 lines correct = 4 marks 6 lines correct = 5 marks
	<b>Total:</b>	<b>5</b>	

Question	Answer	Marks	Guidance																								
5(a)	group of organisms that reproduce ; offspring are fertile ;	2																									
5(b)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>amphibians</th> <th>reptile</th> <th>bird</th> <th>mammal</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td></td> <td>✓</td> <td>✓</td> </tr> <tr> <td></td> <td></td> <td></td> <td>✓</td> </tr> </tbody> </table> <p style="text-align: right;">..... .....</p>	amphibians	reptile	bird	mammal			✓			✓			✓	✓	✓				✓	✓				✓	5	one mark for each correct row
amphibians	reptile	bird	mammal																								
		✓																									
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✓	✓	✓																									
		✓	✓																								
			✓																								
	<b>Total:</b>	<b>7</b>																									

Question	Answer	Marks	Guidance
6(a)(i)	carbon dioxide + water ; → glucose + oxygen ;	2	
6(a)(ii)	<u>chloroplasts</u> ;	1	
6(a)(iii)	palisade mesophyll cell ; spongy mesophyll cell ; guard cell ;	1	
6(b)(i)	rate of photosynthesis increases as temperature rises ; data quote ; rate doubles with 10 °C rise in temperature ; rate increases steadily / AW ;	2	

Question	Answer	Marks	Guidance
6(b)(ii)	chemical reactions occur faster at higher temperature ; diffusion more rapid at higher temperatures ; enzymes work faster at higher temperatures ; particles have more energy (at higher temperatures) so move more quickly ; (and so) make more frequent collisions ;	<b>2</b>	
6(b)(iii)	<i>prediction:</i> rate of photosynthesis would decrease / stop ; <i>reason:</i> enzymes destroyed / AW ;	<b>2</b>	<b>A</b> plant dies / wilts / is dehydrated <b>A</b> plant loses water / transpires more rapidly than it can absorb water
	<b>Total:</b>	<b>10</b>	

Question	Answer	Marks	Guidance
7(a)	<u>deforestation</u> ; <u>photosynthesis</u> ; <u>carbon dioxide</u> ; methane / water vapour ;	<b>4</b>	
7(b)	more land area ; for farming / grow crops / rear animals / for building houses / factories etc. / approaching enemies can be seen / for roads / pylons / fences etc. / for mines ;;  obtain wood ; for building / making furniture / warmth / cooking / make smoke / to make paper ;;  to destroy habitats (of unwanted animals / plants) ;  to deter wild / dangerous animals ;  AVP ;	<b>4</b>	
7(c)	flooding ; soil erosion ; leaching ; mud slides ; desertification ; changing weather patterns ; habitat destruction / extinction / loss of biodiversity ; loss of potential medical chemicals ; AVP ;;	<b>2</b>	
	<b>Total:</b>	<b>10</b>	



Question	Answer	Marks	Guidance
8(a)(i)	the Sun ;	1	
8(a)(ii)	transfer of energy ;	1	
8(a)(iii)	three ;	1	
8(a)(iv)	<u>snake</u> ;	1	
8(a)(v)	<i>number of hawks:</i> would increase / AW ;  <i>explanation:</i> lizards / grasshoppers / slugs, not eaten by snakes ; so increase in number ; more food for hawks ;	3	max 2 for explanation  <b>A</b> (more slugs as not eaten) so more blackbirds ;
8(b)(i)	line drawn from snakes to eagles <b>and</b> line from lizards to eagles <b>with</b> arrows in correct direction ;	1	
8(b)(ii)	<i>increase eagles</i> more snakes / more lizards / other food source ;  <i>decrease eagles</i> fewer snakes / fewer lizards / disease / competition (with another species) / natural disaster ;	2	
8(b)(iii)	<i>population:</i> organisms of same species / type ; living in same area / at the same time ;	2	
	<b>Total:</b>	<b>12</b>	

Question	Answer	Marks	Guidance
9(a)	<b>L</b> sperm duct; <b>M</b> prostate gland; <b>N</b> <u>urethra</u> ; <b>P</b> <u>scrotum</u> ; <b>R</b> testis;	<b>5</b>	
9(b)(i)	(centre of) <b>X</b> on testis ;	<b>1</b>	
9(b)(ii)	circle drawn at end of the urethra ;	<b>1</b>	
9(c)	<i>prostate gland</i> : produces liquid (so the sperm can swim) / produces mucus / produces alkaline liquid;  <i>scrotum</i> : protects the testis / keeps testis, cool / below body temperature;	<b>2</b>	<b>A</b> produces nutrient / glucose
9(d)	condom / femidom / diaphragm ;	<b>1</b>	
	<b>Total:</b>	<b>10</b>	