



BIOLOGY

0610/32

Paper 3 Theory (Core)

May/June 2017

MARK SCHEME

Maximum Mark: 80

Published

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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

Mark schemes will use these abbreviations

- ; separates marking points
- / alternatives
- **I** ignore
- **R** reject
- **A** accept (for answers correctly cued by the question, or guidance for examiners)
- AW alternative wording (where responses vary more than usual)
- 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 word given must be used by candidate (grammatical variants excepted)
- max indicates the maximum number of marks that can be given

Question	Answer	Marks	Guidance																		
1	<table border="1"> <thead> <tr> <th data-bbox="349 240 613 309">name of tree</th> <th data-bbox="613 240 736 309">letter</th> </tr> </thead> <tbody> <tr> <td data-bbox="349 309 613 378">go to 2</td> <td data-bbox="613 309 736 378"></td> </tr> <tr> <td data-bbox="349 378 613 430">go to 4</td> <td data-bbox="613 378 736 430"></td> </tr> <tr> <td data-bbox="349 430 613 483">go to 3</td> <td data-bbox="613 430 736 483"></td> </tr> <tr> <td data-bbox="349 483 613 536"><i>Hedera</i></td> <td data-bbox="613 483 736 536">E</td> </tr> <tr> <td data-bbox="349 536 613 588"><i>Magnolia</i></td> <td data-bbox="613 536 736 588">C</td> </tr> <tr> <td data-bbox="349 588 613 641"><i>Quercus</i></td> <td data-bbox="613 588 736 641">A</td> </tr> <tr> <td data-bbox="349 641 613 694"><i>Aesculus</i></td> <td data-bbox="613 641 736 694">B</td> </tr> <tr> <td data-bbox="349 694 613 746"><i>Sorbus</i></td> <td data-bbox="613 694 736 746">D</td> </tr> </tbody> </table>	name of tree	letter	go to 2		go to 4		go to 3		<i>Hedera</i>	E	<i>Magnolia</i>	C	<i>Quercus</i>	A	<i>Aesculus</i>	B	<i>Sorbus</i>	D	4	1 correct = 1 mark 2 correct = 2 marks 3 or 4 correct = 3 marks 5 correct = 4 marks
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Question	Answer	Marks	Guidance												
2(a)	<table border="1"> <tr> <td data-bbox="344 280 674 331">process</td> <td data-bbox="674 280 1355 331">letter</td> </tr> <tr> <td data-bbox="344 331 674 383">ingestion</td> <td data-bbox="674 331 1355 383">A ;</td> </tr> <tr> <td data-bbox="344 383 674 434">mechanical digestion</td> <td data-bbox="674 383 1355 434">A / D ;</td> </tr> <tr> <td data-bbox="344 434 674 485">secretion of protease</td> <td data-bbox="674 434 1355 485">D / E ;</td> </tr> <tr> <td data-bbox="344 485 674 536">absorption of nutrients</td> <td data-bbox="674 485 1355 536">F ;</td> </tr> <tr> <td data-bbox="344 536 674 587">egestion</td> <td data-bbox="674 536 1355 587">H ;</td> </tr> </table>	process	letter	ingestion	A ;	mechanical digestion	A / D ;	secretion of protease	D / E ;	absorption of nutrients	F ;	egestion	H ;	5	
process	letter														
ingestion	A ;														
mechanical digestion	A / D ;														
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egestion	H ;														
2(b)(i)	are <u>protein</u> (s) ; that function as biological <u>catalysts</u> ;	2	I speeds up reaction												
2(b)(ii)	fatty acid(s) ; glycerol ;	2	either order												
2(b)(iii)	carbon, hydrogen and oxygen ;	1													
2(b)(iv)	butter ; olive oil ;	2													
2(b)(v)	carbohydrate ; protein ; vitamins ; mineral salts ; fibre / roughage ; water ;	3	I fat A named vitamin once A named mineral once I examples of foods												

Question	Answer	Marks	Guidance
2(b)(vi)	for energy / respiration / metabolism ; insulation / thermal insulation / electrical insulation / myelin / maintains temperature ; storage of fat / vitamins ; making cell membranes ; protection (against mechanical damage) / cushions organs / shock absorber ; help body absorb vitamins / AW ; AVP ; e.g. hormones , buoyancy	1	A reduce heat loss / keeps body warm R insulin

Question	Answer	Marks	Guidance
3(a)		4	1 mark for each correctly linked hormone
3(b)	reduce blood glucose / sugar (concentration) ; or (promotes conversion of) glucose to glycogen ;	1	I regulates / controls
3(c)(i)	ovum / egg (cell) / ova ;	1	
3(c)(ii)	flagellum ; enzymes / acrosome ; small size / streamlined ; mitochondria (in flagellum) ; only one set of chromosomes / haploid ;	2	

Question	Answer	Marks	Guidance
3(c)(iii)	meiosis ;	1	
3(d)(i)	increased breathing rate ; dilates airways in the lungs; increased, heart / pulse rate ; pupil dilation ; increased blood pressure; increased / divert, blood to muscles; speeds up reaction time; AVP ;	2	A increased depth / volume of breathing A increased blood glucose concentration / increased metabolic rate A increased mental awareness
3(d)(ii)	<i>the following three boxes ticked</i> bungee jumping ; sitting an exam ; hearing a sudden noise ;	3	

Question	Answer	Marks	Guidance
4(a)	chemical ; cells ; nutrient ; oxygen ;	4	
4(b)(i)	80 (kJ) ;;	2	1 mark for correct working if answer wrong 1600 x 0.05 or equivalent calculation
4(b)(ii)	carbon dioxide ; water ;	2	either order
4(b)(iii)	muscle contraction / muscle doing work / (muscle) movement ; metabolism / enzyme reactions / chemical reactions / digestion; protein synthesis ; cell division / cell repair; active transport ; growth ; passage of nerve impulses ; maintenance of a constant body temperature ; excretion;	3	I exercise A reproduction A shivering / keep warm / homeostasis
4(c)	(muscle produces) lactic acid ; ora or (muscle) does not produce carbon dioxide / ethanol / alcohol ; ora	1	A ora only if yeast stated
4(d)	brewing / making alcoholic drinks / making beer / bread-making / biofuels / making ethanol / making carbon dioxide ;	1	A fermentation

Question	Answer	Marks	Guidance										
5(a)	(pulmonary) artery correctly labelled ; (pulmonary) vein correctly labelled ;	2											
5(b)	(presence of) valves ; thin(ner) walls ; wide(r) lumen ; less, muscular / elastic, tissues / fibres ;	2											
5(c)	<table border="1"> <thead> <tr> <th data-bbox="349 544 607 628">component of blood</th> <th data-bbox="607 544 1355 628">function</th> </tr> </thead> <tbody> <tr> <td data-bbox="349 628 607 679">red blood cells</td> <td data-bbox="607 628 1355 679">carries / transport oxygen ;</td> </tr> <tr> <td data-bbox="349 679 607 730">white blood cells</td> <td data-bbox="607 679 1355 730">phagocytosis / antibody production / defence / immunity ;</td> </tr> <tr> <td data-bbox="349 730 607 782">platelets</td> <td data-bbox="607 730 1355 782">clotting ;</td> </tr> <tr> <td data-bbox="349 782 607 900">plasma</td> <td data-bbox="607 782 1355 900">transport of, blood cells / ions / (soluble) nutrients (named) / hormones / carbon dioxide / heat / urea / water / named molecule / enzymes ;</td> </tr> </tbody> </table>	component of blood	function	red blood cells	carries / transport oxygen ;	white blood cells	phagocytosis / antibody production / defence / immunity ;	platelets	clotting ;	plasma	transport of, blood cells / ions / (soluble) nutrients (named) / hormones / carbon dioxide / heat / urea / water / named molecule / enzymes ;	4	
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Question	Answer	Marks	Guidance						
6(a)(i)	arrow pointing upwards for shoot and arrow pointing downwards for root ;	1							
6(a)(ii)	gravitropism ;	1							
6(b)	B – lack of / no, moisture / water ; C – lack of / no, oxygen ; D – (too) cold / lack of warmth / inappropriate temperature ;	3							
6(c)(i)	<table border="1"> <thead> <tr> <th>mineral ion</th> <th>function in plants</th> </tr> </thead> <tbody> <tr> <td>nitrate</td> <td>making, amino acids / proteins ;</td> </tr> <tr> <td>magnesium</td> <td>for chlorophyll ;</td> </tr> </tbody> </table>	mineral ion	function in plants	nitrate	making, amino acids / proteins ;	magnesium	for chlorophyll ;	2	
mineral ion	function in plants								
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6(c)(ii)	root hair cell ;	1							

Question	Answer	Marks	Guidance
7(a)	small ears ; reduce heat loss ; or fur / coat ; reduce heat loss / insulation / keep body temperature constant; or white, hair/fur ; for camouflage ; or large body / small surface area to volume ratio ; reduce heat loss ; or large feet ; spread weight on snow / ice ; or dark / black nose lips ; heat absorption AW ;	2	explanation must relate to the given feature features must be visible in Fig. 7.1
7(b)	1 variation within, populations / organisms ; 2 more offspring produced than will survive ; 3 competition (for resources) ; 4 best adapted survive ; 5 best adapted reproduce ; 6 passing on their, alleles (to the next generation) ;	4	

Question	Answer	Marks	Guidance
7(c)(i)	<p><i>reasons for becoming endangered</i></p> <p>climate change/ global warming ; habitat destruction / ice melting ; hunting / poaching ; pollution ; reduced (access to) food supply ; AVP ; e.g. disease</p> <p><i>conservation methods</i></p> <p>protecting habitats / national park ; ref to education ; captive breeding programmes ; zoos / wildlife park / sanctuary / protecting species ;</p>	4	max 3 from either section

Question	Answer	Marks	Guidance								
8(a)(i)	<u>male 20–34</u> ;	1									
8(a)(ii)	16 (%) ;	1									
8(b)	<table border="1"> <thead> <tr> <th data-bbox="344 357 786 416">component in cigarette smoke</th> <th data-bbox="786 357 1355 416">effect on the body</th> </tr> </thead> <tbody> <tr> <td data-bbox="344 416 786 496">carbon monoxide</td> <td data-bbox="786 416 1355 496">reduces oxygen carrying capacity of blood / AW ;</td> </tr> <tr> <td data-bbox="344 496 786 647">tar</td> <td data-bbox="786 496 1355 647">(named) cancer / irritates airways / damages cilia / COPD / emphysema / (stimulates) increased mucus production ;</td> </tr> <tr> <td data-bbox="344 647 786 735">nicotine</td> <td data-bbox="786 647 1355 735">addictive / stimulant / increases blood pressure ;</td> </tr> </tbody> </table>	component in cigarette smoke	effect on the body	carbon monoxide	reduces oxygen carrying capacity of blood / AW ;	tar	(named) cancer / irritates airways / damages cilia / COPD / emphysema / (stimulates) increased mucus production ;	nicotine	addictive / stimulant / increases blood pressure ;	3	
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8(c)	stress / too much salt in diet / too much fat in diet / obesity / genetic predisposition / age / gender / diabetes / cholesterol / lack of exercise / high blood pressure ;;	2									