



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY

0610/31

Paper 3 Theory (Core)

May/June 2017

MARK SCHEME

Maximum Mark:80

Published

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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(a)	A – iris ; B – pupil ;	2	
1(b)(i)	(pupil / B) becomes smaller / constricts / AW ;	1	ecf
1(b)(ii)	reduces the amount of light (entering the eye) / stops too much light (entering eye) ; protects, retina (cells) / receptors / sensors, from damage / AW ;	2	

Question	Answer	Marks	Guidance
2(a)	adrenal — adrenaline — lowers blood glucose ovary — insulin — increase in breathing rate pancreas — oestrogen — growth of chest hair testis — testosterone — breast development 	6	for each column of lines: 3 or 4 correct = 3 marks 2 correct = 2 marks 1 correct = 1 mark R if more than 1 line coming from a box

Question	Answer	Marks	Guidance
2(b)	in the blood / in the plasma ;	1	A in the blood stream / in the blood vessels / circulatory system / in the veins / arteries / capillaries R inside any blood cell (including platelets)

Question	Answer	Marks	Guidance
3(a)	<u>1 dm³ per min(ute)</u> ;	1	
3(b)	liver ; gall bladder ; brain ; kidney ; testes ; ovaries ; pancreas ; lungs ; spleen ; uterus ; AVP ; ;	2	A any structure that is an organ A artery / vein / bone
3(c)(i)	1100 (%) ; ;	2	ecf from 3(a) $11 \div 1 \times 100$ or $12 - 1 \div 1 \times 100$
3(c)(ii)	<u>oxygen</u> ; <u>glucose</u> ;	2	either order

Question	Answer	Marks	Guidance
3(c)(iii)	more energy / ATP, needed by heart muscle / it / (skeletal) muscle ; from respiration ; because (heart muscle) has to contract more, strongly / forcefully ; (heart muscle) has to contract, more frequently / heart beats faster ; (because) blood flow to (skeletal) muscles increases / blood flows faster to the (skeletal) muscles ;	3	AW throughout
3(d)(i)	data quote used to support either statement ; <i>alimentary canal:</i> decreased (blood flow) / goes down / AW ; <i>skin:</i> increased (blood flow) / goes up / AW ;	3	
3(d)(ii)	digestion / absorption not a priority / AW ; blood (volume), needed elsewhere in body / to go to the muscles / AW ; AVP ;	1	

Question	Answer	Marks	Guidance
3(d)(iii)	1 exercise / muscles release heat ; 2 (and so) the body gets hotter / body temp increases ; 3 blood carries heat ; 4 heat lost at skin (surface) ; 5 ref to homeostasis / precise description of ;	3	
Question	Answer	Marks	Guidance
4	<u>glucose</u> : <u>lactic acid</u> : alcohol ; carbon dioxide ;	4	

Question	Answer		Marks	Guidance
5(a)	D / E	adaptive feature	4	feature and reason must match feature must be visible AW throughout
	D	(canine) teeth large mouth / jaws / beak (long / strong), tail webbed, toes / feet scaly / rough, skin / has scales markings / AW eyes on top of head AVP ;		
	E	claws / nails / talons beak wings (tail) feathers forward facing eyes AVP ;		

Question	Answer	Marks	Guidance
5(b)	2 → 1 → 4 → 3 → 5 or ; ; ; 1 → 2 → 4 → 3 → 5	3	1 and 2 at start in either order 3 after 4 (somewhere) 5 at the end

Question	Answer		Marks	Guidance
6(a)(i)	feature	non-smoker	3	
	length of cilia	long / large / big		
	number of cilia	many / more / large		
	size of air space	wide		
	size of mucus layer	thin / narrow / less / small / evenly distributed		
		smoker		
		short / small ;		
		few / little / less ;		
		narrow		
		thick / wide / big / more / large / uneven thickness ;		

Question	Answer			Marks	Guidance																			
6(a)(ii)	<table><tr><td>feature</td><td>non –smoker</td><td>smoker</td></tr><tr><td>bacteria present in mucus</td><td>few</td><td>many / more ;</td></tr><tr><td>total diameter / bronchiole size</td><td>wide / larger / longer</td><td>narrow / smaller ;</td></tr><tr><td>shape of lumen</td><td>circular</td><td>oval ;</td></tr><tr><td>number of muscle cells</td><td>many / more</td><td>few / less ;</td></tr><tr><td>size of muscle cells</td><td>small</td><td>large ;</td></tr><tr><td>AVP</td><td></td><td>;</td></tr></table>	feature	non –smoker	smoker	bacteria present in mucus	few	many / more ;	total diameter / bronchiole size	wide / larger / longer	narrow / smaller ;	shape of lumen	circular	oval ;	number of muscle cells	many / more	few / less ;	size of muscle cells	small	large ;	AVP		;	2	
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6(b)	bacteria cause infections ; bacteria (trapped) in mucus ; insufficient / damaged cilia ; (so) mucus / bacteria, not removed / stay in / build up in, (lung / bronchiole) or mucus / bacteria, will enter alveoli ; AVP ;	2																						
6(c)	carbon monoxide ; tar ; nicotine ; particulates ; AVP ; ;	2																						

Question	Answer			Marks	Guidance																																												
7	<table><tr><td></td><td>Description</td><td>Name</td><td>Letter</td></tr><tr><td>1</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td></td><td><i>Plumbago maritime</i></td><td>J</td></tr><tr><td></td><td></td><td><i>Plumbago lanceolata</i></td><td>K</td></tr><tr><td>3</td><td></td><td><i>Ilex aquifolium</i></td><td>L</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>4</td><td></td><td><i>Nymphaea alba</i></td><td>G</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td><i>Trifolium pratense</i></td><td>M</td></tr><tr><td></td><td></td><td><i>Lupinus arboreus</i></td><td>H</td></tr></table>				Description	Name	Letter	1								2		<i>Plumbago maritime</i>	J			<i>Plumbago lanceolata</i>	K	3		<i>Ilex aquifolium</i>	L					4		<i>Nymphaea alba</i>	G					5		<i>Trifolium pratense</i>	M			<i>Lupinus arboreus</i>	H	5	1 correct = 1 mark 2 correct = 2 marks 3 correct = 3 marks 4 or 5 correct = 4 marks 6 correct = 5 marks
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8(a)	breakdown of molecules ; large to small (molecules) / food to small(er) molecules ; insoluble to soluble (molecules) ;	3															
8(b)	<table><tr><td>name of structure</td><td>letter from Fig. 8.1</td></tr><tr><td>salivary gland</td><td>P</td></tr><tr><td>anus</td><td>X ;</td></tr><tr><td>large intestine</td><td>W ;</td></tr><tr><td>mouth</td><td>N ;</td></tr><tr><td>pancreas</td><td>U ;</td></tr><tr><td>stomach</td><td>S ;</td></tr></table>	name of structure	letter from Fig. 8.1	salivary gland	P	anus	X ;	large intestine	W ;	mouth	N ;	pancreas	U ;	stomach	S ;	5	
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8(c)	<i>function of the liver</i> production of bile ; formation of urea / breakdown of (excess) amino acids ; breakdown of, alcohol or toxins / harmful substances ; glucose converted to glycogen ; ora glycogen stored ; AVP ; <i>function of the small intestine</i> digestion / breakdown of food / absorption ;	2	max 1 from each section e.g. deamination / formation of cholesterol / breakdown of, red blood cells or haemoglobin / breakdown of hormones / metabolism of lactic acid / stores vitamins and minerals / formation of (named) plasma proteins
8(d)	protein is, digested / acted on / broken down, by protease / named protease ; protease from, stomach / pancreas / small intestine ; (digested to) polypeptides / amino acids AW ; acid conditions in stomach ; alkaline / neutral conditions in small intestine ; AVP ;	4	e.g. activation of enzymes
8(e)	oral rehydration therapy / AW ;	1	

Question	Answer	Marks	Guidance																				
9(a)(i)	X = epidermis ; Y = palisade (mesophyll) ;	2	R lower epidermis I cuticle I mesophyll unqualified R spongy mesophyll																				
9(a)(ii)	to let light through / light can reach, (palisade) mesophyll cells / chloroplasts ;	1																					
9(b)(i)	Z = stoma ;	1	A stomata / guard cell R stroma																				
9(b)(ii)	<u>diffusion</u> ;	1																					
9(b)(iii)	<table border="1"> <thead> <tr> <th></th><th colspan="3">movement of gas</th></tr> <tr> <th>name of gas</th><th>into leaf</th><th>out of leaf</th><th>no movement</th></tr> </thead> <tbody> <tr> <td>carbon dioxide</td><td>✓;</td><td></td><td></td></tr> <tr> <td>oxygen</td><td></td><td>✓;</td><td></td></tr> <tr> <td>water vapour</td><td></td><td>✓;</td><td></td></tr> </tbody> </table>		movement of gas			name of gas	into leaf	out of leaf	no movement	carbon dioxide	✓;			oxygen		✓;		water vapour		✓;		3	
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