



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY

0610/33

Paper 3 Theory (Core)

May/June 2016

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.

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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 (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

Page 3	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks	Guidance
1 (a)	jointed legs ; segmented (body) ; exoskeleton ;	[max 1]	R 3 pairs jointed legs
(b) (i)	<u>insects</u> ;	[1]	
(ii)	6 legs / 3 pairs of legs ; 3 body parts ; has (1 pair of) antennae ; wings ;	[max 2]	
		[Total: 4]	

Page 4	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks	Guidance
2 (a) (i)	narrower lumen/ AW ; thicker wall ; more muscular/ elastic wall ; valve present (at base)/ AW ;	[max 2]	
(ii)	low pressure, oxygenated ;	[1]	
(b)	vena cava pulmonary artery pulmonary vein aorta ...	[3]	3 or 4 correct = 3 2 correct = 2 1 correct = 1
		[Total: 6]	
3 (a) (i)	transpiration/ evaporation ;	[1]	
(ii)	cortex cells xylem mesophyll cells stomata ...	[3]	3 or 4 correct = 3 2 correct = 2 1 correct = 1

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Question	Answer	Marks	Guidance
(b) (i)	<i>description</i> decrease / AW ; plateau ; data quotation / usage ; <i>explanation</i> plant absorbs water ; (lost by) transpiration / evaporation ; rate of transpiration / evaporation varies ; reason as to why it varies ;	[max 4]	
(ii)	(425–380=) 45 (cm ³) ;	[1]	
(iii)	has bigger leaves ; more leaves ; larger surface area ;	[max 1]	
		[Total: 10]	

Page 6	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks	Guidance
4 (a)	diet with all classes/groups of nutrients; in the correct proportions ; in the correct amounts ; ref. to energy ; idea of staying healthy ;	[max 2]	A list of at least 5 groups.
(b) (i)	(rich in) carbohydrates/ starch ; provide energy/ joules/ calories; for physical activity/ body processes ;	[max 2]	
(ii)	meat/ fish/ eggs/ beans/ milk and dairy foods ; needed for growth/ repair/ to make enzymes/ build muscles ;	[2]	must have at least 2 foods
(iii)	obesity/ overweight ; CHD/ heart disease/ high blood pressure ; diabetes ; liver disease/ gall stones ;	[max 1]	

Page 7	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks	Guidance
(iv)	age of person ; if they are growing or not ; activity of person ; idea of more food (group) for energy/ repair or build tissues ; obese/ anorexic ; might need to lose or gain weight ; gender ; females generally require less than males ; pregnancy or lactating ; more food need ; ref. to different metabolic rates ; needing more or less food ; medical conditions e.g. diabetes, allergies, illness ; need to avoid gluten/ sugars/ fats/ allergens/ lactose OR need to eat certain food to alleviate a medical condition ; personal choice/ vegetarian/ vegan/ religious/ taste ; appropriate change in diet to suit choice diet ;	[max 4]	one mark for factor and one mark for explanation. explanation must be linked to the factor A sex
		[Total: 11]	

Page 8	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks	Guidance
5 (a)	change the genetic material (of an organism) ; by removing / changing / inserting (individual) genes ; from one organism / species to another ;	[max 2]	
(b) (i)	length of DNA ; that codes for a protein;	[2]	
(ii)	insecticide in leaves will kill insects ; (fewer insects) means less plants eaten ; (so) more leaves / plants allows more photosynthesis / growth; higher (crop) yield ; less / no money spent on insecticides ;	[max 2]	
(c) (i)	pollen / male gamete, transferred (from anther) to stigma / female plant / gamete ;	[1]	
(ii)	fewer, insects / pollinators; apples are not pollinated ;	[max 1]	
(d)	<i>any 2 from:</i> herbicide resistance / enhance crop nutritional value / increase drought tolerance / disease resistance / produce insulin / bioluminescence / AVP ;;	[max 2]	R insecticide
		[Total: 10]	

Page 9	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks	Guidance														
6 (a)	chemical; produced / secreted by a (endocrine) gland; carried / transported in the blood / plasma ; to a target organ;	[max 3]															
(b) (i)	<table><tr><td>part</td><td>name</td><td>hormone</td></tr><tr><td>J</td><td>pancreas ;</td><td>insulin</td></tr><tr><td>K</td><td>adrenal glands ;</td><td>adrenaline</td></tr><tr><td rowspan="2">Reproductive organs</td><td>ovaries</td><td>oestrogen / progesterone ;</td></tr><tr><td>testes ;</td><td>testosterone ;</td></tr></table>	part	name	hormone	J	pancreas ;	insulin	K	adrenal glands ;	adrenaline	Reproductive organs	ovaries	oestrogen / progesterone ;	testes ;	testosterone ;	[5]	
part	name	hormone															
J	pancreas ;	insulin															
K	adrenal glands ;	adrenaline															
Reproductive organs	ovaries	oestrogen / progesterone ;															
	testes ;	testosterone ;															

Page 10	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks	Guidance
(ii)	<i>situation:</i> in (named) fright, fight or flight' situations ; <i>importance:</i> (body changes) allows for escape / avoidance / preparation for activity / to survive ;	[max 2]	
		[Total: 10]	
7 (a)	rapid reproduction ; can make complex molecules ; cheaper to produce ;	[max 2]	
(b) (i)	(contain) enzymes; break down / digests food molecules (in stain);	[2]	
(ii)	at high temperature enzymes, do not function / inactive / destroyed ; enzymes more active at 30°C ; AVP ;	[max 2]	A denatured R enzymes die / killed A optimum temperature is 30°C e.g. 60°C uses more energy than 30°C
(iii)	enzymes are catalysts / not used up in the reaction ;	[1]	
(c)	<u>lipase</u> ;	[1]	
		[Total: 8]	

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Question	Answer	Marks	Guidance										
8 (a) (i)	line touching lens; labelled lens;	[2]											
(ii)	line touching retina ; labelled retina ;	[2]											
(b) (i)	transmission of genetic information from generation to generation ;	[1]											
(ii)	<i>recessive</i> – only expressed when there is no dominant (allele of the gene) present ; <i>allele</i> – a version of a gene ;	[2]											
(c)	<table border="1"><thead><tr><th>person</th><th>genotype</th></tr></thead><tbody><tr><td>1</td><td>gg</td></tr><tr><td>2</td><td>Gg</td></tr><tr><td>3</td><td>Gg</td></tr><tr><td>4</td><td>Gg</td></tr><tr><td>5</td><td>gg</td></tr></tbody></table> 	person	genotype	1	gg	2	Gg	3	Gg	4	Gg	5	gg
person	genotype												
1	gg												
2	Gg												
3	Gg												
4	Gg												
5	gg												

Page 12	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks	Guidance
9 (a) (i)	(an animal that gets its) energy by eating plants ;	[1]	
(ii)	decomposers ;	[1]	A detritivores
(iii)	nutrients are recycled / resources are recycled ; water is recycled; no need to feed ducks / fish ; idea of nothing extra is needed to sustain system / limited use of resources from outside the system; waste from one organism is used by another organism ; idea of self-contained system / self-sustaining system ;	[max 3]	
(b)	(resource) produced as rapidly as it is removed ; from the environment ; so it does not run out ;	[max 2]	
		[Total: 7]	

Page 13	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks	Guidance
10 (a)	cushions/protects (fetus) ; allows (fetus) to move ; supports (fetus) ;	[max 1]	I reference to maintains temperature
(b)	<i>box 2 and 3:</i> cervix dilates / amniotic sac bursts (either order) ;; <i>box 4:</i> baby passes down vagina ; <i>box 6:</i> placenta delivered ;	[max 3]	3 or 4 correct = 3 2 correct = 2 1 correct = 1
		[Total: 4]	