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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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

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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]	

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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)	*description* decrease / AW ; plateau ; data quotation / usage ; *explanation* 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]	

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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]	

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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]	

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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)	*any 2 from:* herbicide resistance / enhance crop nutritional value / increase drought tolerance / disease resistance / produce insulin / bioluminescence / AVP ;;	[max 2]	**R** insecticide
		[Total: 10]	

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6 (a)</td><td>chemical;
produced / secreted by a (endocrine) gland;
carried / transported in the blood / plasma ;
to a target organ;</td><td>[max 3]</td><td></td></tr>
<tr><td>(b) (i)</td><td>
<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>
</td><td>[5]</td><td></td></tr>
</table>

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Question	Answer	Marks	Guidance
(ii)	*situation:* in (named) fright, fight or flight' situations ; *importance:* (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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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>8 (a) (i)</td><td>line touching lens;

labelled lens;</td><td>

[2]</td><td></td></tr>
<tr><td>(ii)</td><td>line touching retina ;

labelled retina ;</td><td>

[2]</td><td></td></tr>
<tr><td>(b) (i)</td><td>transmission of genetic information from generation to generation ;</td><td>[1]</td><td></td></tr>
<tr><td>(ii)</td><td>recessive – only expressed when there is no dominant (allele of the gene) present ;

allele – a version of a gene ;</td><td>

[2]</td><td></td></tr>
<tr><td>(c)</td><td><table><tr><th>person</th><th>genotype</th></tr><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></table>;;;</td><td>[3]</td><td>all correct = 3 marks

person 2 correct =1
person 1 and 5 correct = 1
person 3 and 4 correct =1</td></tr>
<tr><td></td><td></td><td>[Total: 10]</td><td></td></tr>
</table>

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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]	

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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)	*box 2 and 3:* cervix dilates / amniotic sac bursts (either order) ;; *box 4:* baby passes down vagina ; *box 6:* placenta delivered ;	[max 3]	3 or 4 correct = 3 2 correct = 2 1 correct = 1
		[Total: 4]	

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