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

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.

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Page 2	Mark Scheme	Syllabus	Paper
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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

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

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

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]	

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]	

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]	

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]	

<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>

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]	

<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><td>person</td><td>genotype</td></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>

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]	

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]	