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Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/33**

Paper 3 Theory (Core) **October/November 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
- 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 words given must be used by the candidate (or grammatical variants of them)

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Question	Answer	Mark	Further guidance
1(a)	all have a backbone ;	**1**	
1(b)(i)	birds / Aves;	**1**	
1(b)(ii)	*any 2 from* feathers; (pair of) wings; beaks; (lay) hard-shelled eggs;	**2**	**R** features shared with other vertebrates e.g. warm-blooded / 'lay eggs' unqualified / claws
		Total: 4	

Question	Answer	Mark	Further Guidance
2(a)(i)	xylem;	**1**	**A** underline or circle the correct word
2(a)(ii)	(cell or cellulose) wall;	**1**	**R** cell membrane **A** vessel / tracheid
2(b)	*transport:* it is hollow / has no contents / has no cytoplasm; *support:* thick / rigid / strong / lignified walls;	**2**	
2(c)	nucleus / cytoplasm / cell membrane / vacuole;	**1**	
		Total: 5	
3(a)	60 (beats per minute);;	**2**	15×4

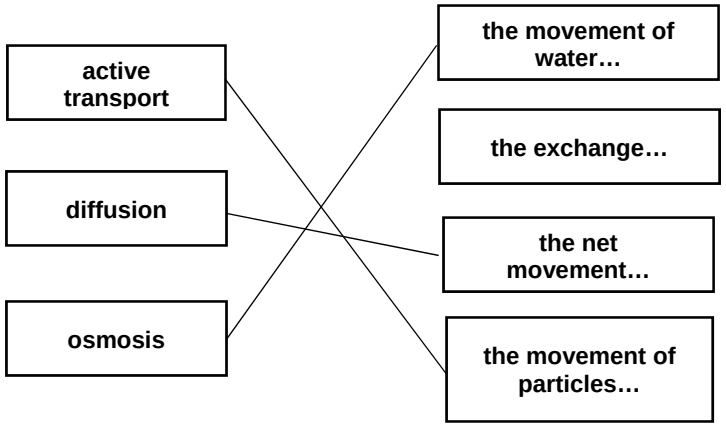
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Question	Answer	Mark	Further guidance
3(b)	valves closing;	**1**	
3(c)(i)	heart rate, increases / faster; more than doubled / 12 beats in 5 secs;	**2**	**I** beats harder
3(c)(ii)	(more) exercise / increased stress levels / fear / excitement / adrenaline / (named) stimulant;	**1**	
3(d)	*description:* blockage of the coronary artery; *risk factors any 1 from*: smoking / lack of exercise / stress / poor diet i.e. too much fat / genetic factors e.g. high cholesterol / obesity / age / gender;	**2**	
		Total: 8	

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Question	Answer	Mark	Further guidance
4(a)	the manufacture of carbohydrate / sugars; using the energy from light; start of (most) food chains /AW;	**3**	
4(b)(i)	chlorophyll;	**1**	
4(b)(ii)	carbon dioxide;	**1**	
4(b)(iii)	oxygen;	**1**	
4(c)(i)	24 (bubbles per minute);	**1**	
4(c)(ii)	the rate of photosynthesis / number of bubbles, decreases as the distance increases ora; the rate of photosynthesis / number of bubbles, increases as light intensity increases ora;	**2**	
4(c)(iii)	3 (bubbles per minute);	**1**	
4(d)	*either:* idea that carbon dioxide; is being used up / is in short supply; *or:* idea that the water is heated up; (this) may damage enzymes / plant (starts to) die ;	**2**	**A** enzymes denature
		Total: 12	

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Question	Answer	Mark	Further guidance
5(a)		**3**	
5(b)(i)	mechanical **and** chemical;	**1**	
5(b)(ii)	biological catalyst; made of protein;	**2**	
5(b)(iii)	amylase – starch; protease / pepsin – protein; lipase – fats;	**1**	
5(b)(iv)	(enzymes) are specific / have a complementary shape; there are many different, foods / nutrients / substrates, to break down;	**2**	
		Total: 9	

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Question	Answer	Mark	Further guidance
6(a)(i)	*any two from:* automatic / involuntary (response) /AW; fast / immediate / sudden (response); same response; integrates / co-ordinates, stimuli and responses;	**2**	**A** unconsciously / without thinking
6(a)(ii)	*idea* that responses are protective / needed for survival / keep safe / avoid getting hurt / AW;	**1**	
6(b)	receptors; sensory neurone; relay neurone; motor neurone; effectors;	**4**	All correct = 4 3 or 4 correct = 3 2 correct = 2 1 correct = 1
6(c)(i)	synapse;	**1**	
6(c)(ii)	spinal cord / CNS / brain;	**1**	
		Total: 9	

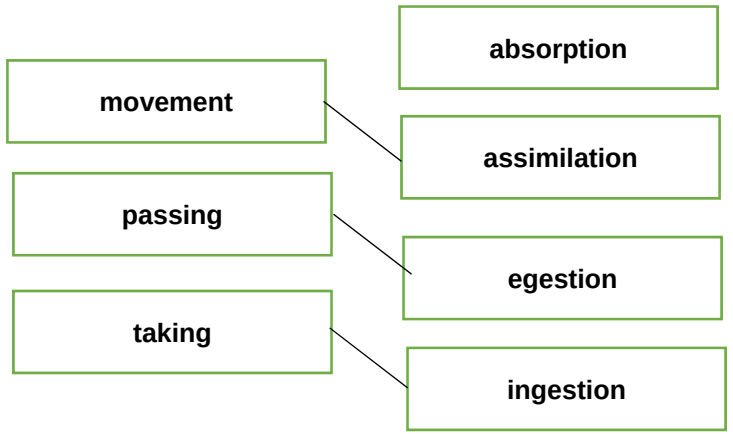
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Question	Answer	Mark	Further guidance
7(a)	*any four from:* slow and easy to catch; not enough left to reproduce; not enough grow to breeding age AW; hunting drove them out of their natural habitats; difficult to find mates; competition for food / not enough food; introduction of disease; destruction of habitat; (goats) damaged their eggs / hatchlings;	**max 4**	
7(b)	*any two from:* captive breeding program; zoos / reserves / national parks; ban hunting; conserve / protect, habitat AW; remove predators / competitors; educate / awareness / research; idea of ecotourism;	**max 2**	
7(c)	*any two from:* more, primary consumers / herbivores / prey; fewer producers; increase in the numbers of other secondary consumers; fewer, tertiary consumers;	**max 2**	
		Total: 8	

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Question	Answer	Mark	Further guidance
8(a)(i)	has two identical alleles of a particular gene; pure breeding;	**2**	
8(b)(i)	a version of a gene;	**1**	
8(b)(ii)	few plants produced green beans / most plants produced purple beans; allele for green beans was masked by the allele for purple beans AW; need, two recessive / no dominant, alleles to get green beans;	**2**	
8(c)	*genotype* is the organisms, genetic make-up / alleles / genes; *phenotype* is the organisms, observable features / outward appearance / how the genes are expressed ;	**2**	
8(d)	selective breeding;	**1**	**A** artificial selection
8(e)	feature of a genetically engineered crop that increases production; e.g. pesticide / herbicide / drought / frost, resistance descript of how this increases production;	**2**	**I** examples of genetically engineered micro-organisms
		Total: 10	

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Question	Answer	Mark	Further guidance
9(a)	 ;;;	**3**	1 mark for each correct line
9(b)(i)	**X** on an incisor; incisor;	**2**	
9(b)(ii)	**Y** on a molar; molar / premolar;	**2**	
9(c)	bacteria feed on sugars; bacteria respire; (this)produces acid; acid dissolves, enamel / A / dentine / B; cavities are formed;	**3**	
		Total: 10	

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Question	Answer	Mark	Further guidance
10(a)	17.5 (%);;	**2**	$(35/200)\times 100$
10(b)(i)	65(J);;	**2**	$200-(100+35)$
10(b)(ii)	*any 1 from:* (named) movement; excretion; repair; growth; digestion; active transport;	**1**	**A** any energy consuming life process except reproduction and respiration
		Total: 5	

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