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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the March 2015 series

0610 BIOLOGY

0610/22 Paper 2 (Core Theory), maximum raw mark 80

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Abbreviations used in the Mark Scheme

- **;** separates marking points
- / separates alternatives within a marking point
- **R** reject
- **ignore** mark as if this material was not present
- **A** accept (a less than ideal answer which should be marked correct)
- AW alternative wording (accept other ways of expressing the same idea)
- underline words underlined (or grammatical variants of them) must be present
- wiggly underline the idea conveyed by the word(s) underlined must be present in the answer
- max indicates the maximum number of marks that can be awarded
- mark independently the second mark may be given even if the first mark is wrong
- ecf credit a correct statement that follows a previous wrong response
- ( ) the word / phrase in brackets is not required, but sets the context
- **ora** or reverse argument
- AVP any valid point

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Question number	Mark Scheme	Mark	Guidance
1 (a)	<table><tr><td>letter</td><td>type of cell</td></tr><tr><td>A</td><td>guard cell;</td></tr><tr><td>B</td><td>phagocyte;</td></tr><tr><td>C</td><td>red blood cell;</td></tr><tr><td>D</td><td>sensory neurone;</td></tr><tr><td>E</td><td>motor neurone;</td></tr><tr><td>F</td><td>(palisade cell)</td></tr></table>	[max 4]	4 or 5 correct = 4 3 correct = 3 2 correct = 2 1 correct = 1
(b) (i)	photosynthesis / make carbohydrate / glucose / sugar;	[1]	**ignore** to make food
(ii)	contains (many) chloroplasts; to absorb energy / light; long and thin / elongated; so many can fit into a small area (of the leaf); chloroplasts close to edge of cell / thin cytoplasmic layer; so that more light / energy can be absorbed;	[max 4] **[Total: 9]**	1 mark for adaptation, 1 mark for function
2 (a)	(aerobic) respiration;	[1]	

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(b) (i)	link of lower dry mass with less growth; **B** (no nitrogen) plant cannot produce proteins / amino acids / enzymes; **C** (no magnesium) plant cannot make chlorophyll; cannot photosynthesise / produce carbohydrate / sugar / glucose; reference to growth (more cells / larger cells) requiring synthesis of chemicals / AW; no carbohydrates / glucose / sugar made means limited energy supplies (for growth);	[max 4]	
(ii)	(**C** plant's) leaves pale green / yellow / AW; growth stunted / AW;	[max 1] **[Total: 6]**	
3 (a)	**P** trachea/windpipe; **Q** bronchus / cartilage ring; **R** air sac / alveolus; **S** diaphragm;	[4]	**A** bronchi **A** alveoli
(b) (i)	x 130;	[1]	
(ii)	nitrogen is not used up / produced by (the cells of) the body;	[1]	**A** nitrogen is not very reactive
(iii)	air sacs / alveoli have a moist lining; water evaporates (from lining into air); water (in lining) replaced by osmosis from cells (of alveoli) / AW;	[max 2]	

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	(c) (i)	(oxygen uptake) increases; reaches a maximum; specific reference to figures in table;	[max 2]	
	(ii)	(12 × 9 =) 108 (kJ);	[1]	
	(iii)	30 / 60 × 12 = 6; 6 / 18 = 0.33;	[2] **[Total: 13]**	
4	**(a)**	(selected for) greater volume / larger animal / higher yield of meat; smaller / absent tusks;	[2]	
	(b)	wild pigs allowed to breed; bigger pigs / pigs with small tusks selected (from offspring); repeat above procedure; for many generations; 'saddleback' type pigs interbreed / not allowed to breed with wild pigs;	[max 3]	
	(c)	parental genotype Nn × (nn); gametes N + n × n + n; offspring genotype Nn nn Nn nn; offspring phenotype white brown white (*brown)*;	[4] **[Total: 9]**	**A** ecf if a mistake is made, but each line must correspond to the previous one **A** recessive given first e.g. nN

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5	**(a)**	carbon dioxide; global warming / greenhouse effect; sulfur dioxide; acid rain / acidification / trees and plants die / aquatic organisms die / leaches minerals from soil; nitrogen oxides; global warming / acid rain / trees and plants die / aquatic organisms die / leaches minerals from soil; methane; global warming; ozone; decrease in level of photosynthesis / decrease in flower and fruit production; AVP;;	[max 4]	1 mark for gas and 1 mark for effect (max 1 effect per gas) **A** rocks / stone of buildings eroded
	(b)	extinction of species / loss of biodiversity / loss of habitat; disruption of food chains; increase in carbon dioxide resulting in global warming; loss of soil / soil erosion; flooding; loss of potential medicines / useful chemicals; changes to water cycle / weather patterns / desertification; AVP;	[max 3] **[Total: 7]**	
6	**(a)**	from ovulation to start of menstruation;	[1]	
	(b) (i)	27 days;	[1]	

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(ii)	14th; (to) 17th;	 [2]	
(c)	(loss of blood) means fewer red blood cells; results in pale colour; (loss of red blood cells) means less haemoglobin; (so) less oxygen carried (by blood); cells cannot carry out sufficient respiration; causing lack of energy and tiredness;	 [max 3]	
(d)	oxygen; glucose; amino acids; glycerol; fatty acids; minerals / iron / calcium; vitamins / vitamin C / vitamin D; antibodies; water;	 [max 3]	**A** any suitable named vitamin or mineral ion **ignore** nutrients / proteins / hormones
(e) (i)	colour; taste / sweetness; succulence / AW; smell;	 [max 1]	
(ii)	prevents overcrowding / less competition; for minerals / water; for light; new habitat / colonisation; (existing) variations may be advantageous in new habitat;	 [max 2] **[Total: 13]**	

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7 (a)	<table><tr><th>function</th><th>letter</th></tr><tr><td>ingestion of food</td><td>A;</td></tr><tr><td>bile storage</td><td>C;</td></tr><tr><td>fat digestion</td><td>G;</td></tr><tr><td>egestion</td><td>H;</td></tr></table>	[4]	
(b)	peristalsis;	[1]	
(c) (i)	fat digestion produces fatty acids (and glycerol); fatty acids lower pH;	[2]	
(ii)	(**B** contains bile) which emulsifies fats; increases surface area for enzyme / lipase action / AW; (so) fatty acids are produced more quickly / more rapid fat digestion; colour of indicator changes more quickly;	[max 3]	
(d)	hot water could denature the enzyme; changes the shape of active site of enzyme / enzyme inactive; tube **C** shows that boiled enzyme does not digest fats;	[max 2]	**R** kills enzyme

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(e)	obesity; (which) leads to joint damage; blockage of blood vessels / heart disease / CHD / atherosclerosis / cardiac arrest; high blood pressure; type 2 diabetes; cancer; AVP;	[max 1] **[Total: 13]**	
8 (a) (i)	(oak) tree / primrose;	[1]	
(ii)	(oak) tree → flies; → (spiders) → blue tits → owl;	[2]	1 mark for first two organisms 1 mark for second two organisms
(b) (i)	group of organisms of the same species; living in the same area (at the same time);	[2]	
(ii)	position of an organism in a food chain/food web; example from food web in Fig. 8.1;	[2]	e.g. flies ate at second trophic level
(c) (i)	decomposer / bacteria / fungi;	[1]	
(ii)	releases minerals from leaves; minerals absorbed (into plant) from soil; releases carbon dioxide; carbon dioxide absorbed by leaves for photosynthesis; AVP;	[max 2] **[Total: 10]**	

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