CAMBRIDGE INTERNATIONAL EXAMINATIONS

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

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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the March 2015 series for most Cambridge IGCSE® components.

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

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]	

(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]	

	(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

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 / 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]	

(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]**	

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

	(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]**	