CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2013 series

0610 BIOLOGY

0610/21 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 May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

Mark schemes will use these abbreviations

- ; separates marking points
- / alternatives
- **R** reject
- **A** accept (for answers correctly cued by the question)
- **I** ignore as irrelevant or inadequate
- **ecf** error carried forward
- **AW** alternative wording (where responses vary more than usual)
- **AVP** alternative valid point
- **ORA** or reverse argument
- **OWTTE** or words to that effect
- underline actual word given must be used by candidate (grammatical variants excepted)
- ( ) the word / phrase in brackets is not required but sets the context
- **D, L, T, Q** quality of: drawing / labelling / table / detail as indicated
- maxindicates the maximum number of marks

	Answer	Marks	Guidance for Examiners
1 (a)	1 intake of nutrients / organic substances / mineral ions; 2 for respiration / growth / tissue repair / metabolic activity;	[2]	A – obtain, ingest, absorb, named nutrient, food A – using light to form organic substances / food I – photosynthesis
(b)	1 the release energy; 2 by the breakdown / oxidation of glucose / sugar;	[2]	A – reaction of oxygen with glucose / sugar
		[Total: 4]	

<table>
<tr>
<td>2 (a)</td>
<td>
<table>
<tr><td></td><td>alcohol</td><td>heroin</td></tr>
<tr><td>addiction</td><td>YES</td><td>YES;</td></tr>
<tr><td>depressant</td><td>YES</td><td>YES;</td></tr>
<tr><td>can cause liver damage when used in excess</td><td>YES;</td><td>YES</td></tr>
</table>
</td>
<td>[3]</td>
<td>1 mark for each correctly completed row.

A – ticks (YES) and crosses (N)</td>
</tr>
<tr><td>(b) (i)</td><td>reduces the carriage of oxygen (by red blood cells) / OWTTE;</td><td>[1]</td><td>A – blocks haemoglobin from carrying oxygen, reduces fetal growth / weight</td></tr>
<tr><td>(ii)</td><td>causes addiction / paralyses cilia / raises blood pressure;</td><td>[1]</td><td>A – increases heart rate, (risk of) thrombosis</td></tr>
<tr><td>(iii)</td><td>can lead to lung cancer / persistent coughing / bronchitis / emphysema / damages cilia;</td><td>[1]</td><td>A – tongue, mouth, trachea, stomach, liver cancers</td></tr>
<tr><td></td><td></td><td>[Total: 6]</td><td></td></tr>
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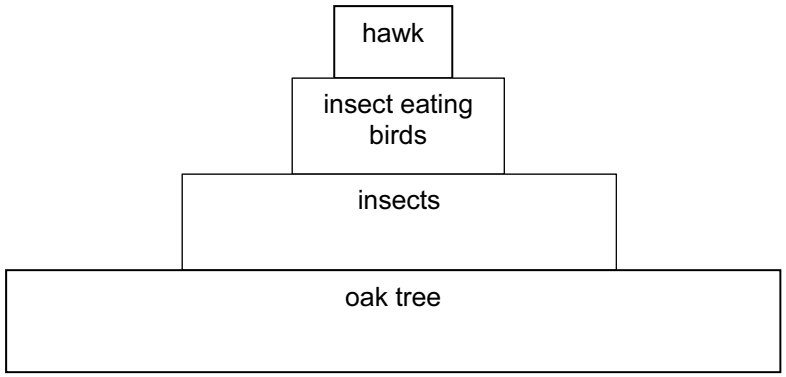
3 (a)	**(i)** C / I;	[1]	Throughout (i) to (v) accept correct names.
	(ii) C;	[1]	
	(iii) B / C / F;	[1]	
	(iv) G;	[1]	R – H
	(v) B;	[1]	
(b)	1 (lipase digests) fats / oils / lipid; 2 into fatty acids; 3 and glycerol; 4 changes large / insoluble to small / soluble molecules; 5 catalyst / speeds up / catalyses (breakdown of fats);	[3]	Any three – 1 mark each
(c) (i)	calcium;	[1]	A – phosphates / fluorides / phosphorus I – fluorine, symbols
(ii)	R – enamel / crown; S – dentine; T – pulp (cavity);	[3]	**A** – named components of pulp e.g. nerves, capillaries

(iii)	1 bacteria (in mouth); 2 use sugars / glucose; 3 release (lactic) acid; 4 this erodes enamel; 5 allows entry of bacteria to dentine / live tissue; 6 ref to poor dental hygiene;	max [3]	A – ref to acid in foods A – breakdown / destroy / corrodes / dissolves Any three – 1 mark each.
		[Total:15]	

4 (a)	A – petal; B – anther / stamen; C – sepal; D – ovule / ovary / carpel;	 [4]	A – corolla A – calyx I – stigma / style
(b) (i)	transfer of pollen / OWTTE; from male part of plant / anther to female part of plant / stigma;	 [2]	A – male gamete I – refs to mechanism
(ii)	1 having a scent / smell; 2 having a nectary / nectar; 3 having nectary guides / lines on petals; 4 being large / obvious / having a particular shape; 5 being brightly coloured; 6 anthers / stigma enclosed by petals / OWTTE; 7 having sticky / adhesive pollen;	 [4]	 A – honey R – wind-pollinated features Any four – 1 mark each
(c)	*more pollen* the pollen is blown everywhere / randomly distributed / pollen wasted; *light pollen* easily carried by wind / can be carried further;	 [2]	A – higher chance of pollination
		[Total:12]	

5 (a) (i)	1 better medical facilities / drugs / treatments / fewer infant mortalities / longer life span; 2 better hygiene conditions such as improved sewage / refuse disposal / water supply; 3 better nutrition / healthier foods / more food consumed; 4 improved availability of food by better food preservation / storage / less risk of starvation; 5 improved agricultural processes / use of fertilisers / pesticides / crop and animal selection makes more food available; 6 improved transfer of food (worldwide);	[3]	Any three – 1 mark each.
(ii)	1 increased demand for oil / energy / gas / electricity / fuel; 2 increased demand for raw materials / minerals; 3 increased demand for food; 4 increased demand for water; 5 leads to overcrowding; 6 more risk of major / epidemic disease outbreaks; 7 greater risk of conflict; 8 increased amounts of waste for disposal; 9 increased risk of environmental damage / pollution; 10 increased demand for jobs / employment;	[3]	A – increased demand for resources (In lieu of both MPs 1 **and** 2) A – ref to competition is equiv to increased demand . ORA applies to these MPs A - refs to reduced living space Any three – 1 mark each.

(b) (i)	1 radiation (from fall out) affects / alters DNA / causes mutations; 2 can cause cancers / radiation sickness; 3 much fallout has a long radioactive half-life / breaks down very slowly; 4 can enter food chains / description of food chain / bioaccumulation	[2]	Any two – 1 mark each.
(ii)	1 contain pathogens / bacteria / disease causing organisms; 2 leads to disease outbreaks / named disease; 3 can lead to eutrophication of waterways / anaerobic conditions / description; 4 fish / other aquatic organisms may die; 5 has a visual impact / unacceptable smell;	[3]	A – migrate, numbers decrease Any three – 1 mark each
		[Total:11]	

6 (a)	it is an animal / predator that eats other animals; to obtain the energy / raw materials / food it needs;	[2]	A – meat, flesh
(b)	insects;	[1]	
(c)	 column of four boxes, each larger than the one above; each labelled as per food chain / labelled by trophic levels;	[2]	A – birds A – tree A – triangle shape with 4 sections
(d)	photosynthesis; 1 (sun)light is source of energy / is used; 1 absorbed / trapped by chloroplasts / chlorophyll; 3 to react together carbon dioxide and water; 4 to form glucose / sugar; 5 oxygen is also formed / waste product;	[1] max [3]	MPs 1, 3, 4, 5 may be gained from a word equation. I – starch, carbohydrate Any three – 1 mark each.
		[Total: 9]	

7 (a)	*allele* is (any two or more) alternative forms of a gene; *gene* is a length of DNA (that codes for a protein) / part of a chromosome;	[2]	A – piece, segment, part of, thread
(b) (i)	child 5 cannot taste PTC and must have inherited this from parents; allele for not tasting PTC present in parents but is not apparent in both / either parents' phenotype; as parents can taste PTC the allele for tasting must be dominant to the other allele;	[3]	Some points may be gained by annotation of diagram. Accept other letters apart from T,t child (5) cannot taste but parents can; child (5) has double recessive / child tt; received from both / each parent; parents must be heterozygous; parent phenotype shown is taster – thus allele must be dominant; Any 3 – 1 mark each
(ii)	*2* – Tt; *5* – tt;	[2]	
(iii)	TT **and** Tt;	[1]	**NB** - both genotypes needed for 1 mark.
		[Total: 8]	

8	(a)	F – aorta; G – renal vein; H – pulmonary artery;	[3]	
	(b)	1 entering leg muscle has higher concentration of oxygen; 2 has lower concentration of carbon dioxide; 3 has more glucose; 4 has lower temperature; 5 has lower lactic acid concentration; 6 has higher (blood) pressure;	[2]	Assume responses refer to blood entering muscle unless reversed is stated. Need comparative **A** – ORA for blood leaving muscle **A** – more, less for refs to concentration Any two – 1 mark each.
	(c)	1 this allows a lower pressure circulation to the lungs; 2 less likely to damage delicate tissues; 3 higher pressure circulation to rest of body; 4 with greater distance to travel; 5 allows only deoxygenated blood to go to lungs / only oxygenated blood to rest of body / bloods do not mix;	[3]	**A** – capillaries, alveoli Any three – 1 mark each.
			[Total: 8]	

9	**(a)**	(excretion is the) removal from an organism / body; of toxic materials / metabolic waste / substances in excess;	[2]	Only award MP1 if clearly distinct from egestion
	(b)	lungs; carbon dioxide **and** water; kidney; urea a**nd** (mineral) salts / water; skin / sweat gland; water **and** (mineral) salts; liver; bile pigments **and** cholesterol;	[4]	One mark for organ and one mark for <u>two</u> excretory substances A – urea A – bilirubin, biliverdin Any two pairs – 2 marks each.
	(c)	oxygen; carbon dioxide; water;	[1]	Any one – 1 mark.
			[Total: 7]	