CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0610 BIOLOGY

0610/23 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.

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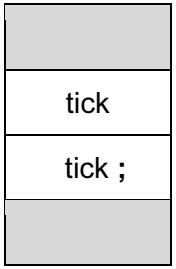
Abbreviations used in the Mark Scheme

- **;** 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
- 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	Answer	marks	Guidance for Examiners
1 (a)	<table><tr><td></td><td>group</td></tr><tr><td>A</td><td>amphibian</td></tr><tr><td>B</td><td>reptile</td></tr><tr><td>C</td><td>insect</td></tr><tr><td>D</td><td>mollusc ;</td></tr></table>	[1]	all correct for 1 mark
(b)	<table><tr><td></td><td>group</td><td>feature 1</td><td>feature 2</td></tr><tr><td>A</td><td>amphibian</td><td>has a backbone</td><td>has slimy skin</td></tr><tr><td>B</td><td>reptile</td><td>has a backbone</td><td>has scaly skin ;</td></tr><tr><td>C</td><td>insect</td><td>no backbone</td><td>has, 6/3 pairs, legs ;</td></tr><tr><td>D</td><td>mollusc</td><td>no backbone</td><td>has a shell ;</td></tr></table>	[3] **[Total: 4]**	ecf from 1(a) 1 mark for each correct row, features can be in either order
2 (a) (i)	right ventricle ;	[1]	**ignore** ventricle alone
(ii)	lung(s) ;	[1]	**ignore** left or right

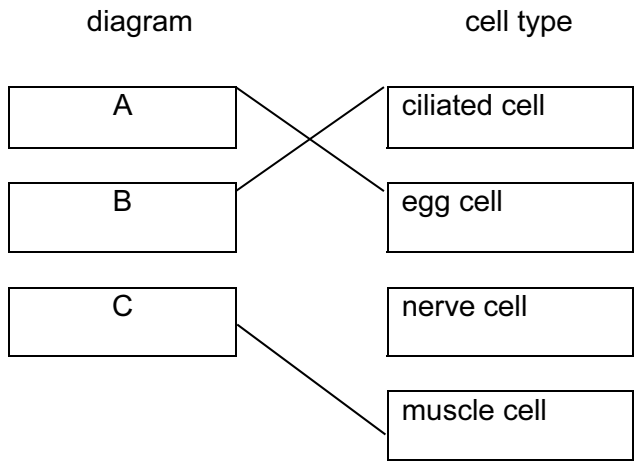
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(iii)		[1]	both ticks correct for 1 mark 0 marks for more than two ticks
(iv)	(cardiac) muscle ;	[1]	
(b) (i)	any valve correctly labelled with a V ;	[1]	
(ii)	ensure one-way flow of blood / prevent blood flowing in the wrong direction / prevent backflow / AW ;	[1]	
(c) (i)	(heartbeat) faster / accelerates / speeds up / AW ; contracts more, forcefully / strongly, / AW ; increased output per beat / increased stroke volume / AW ;	[max 2]	**ignore** contracts better / more efficient **ignore** pumps more blood **A** 'heartbeat increases' for 1 mark if no other marks awarded

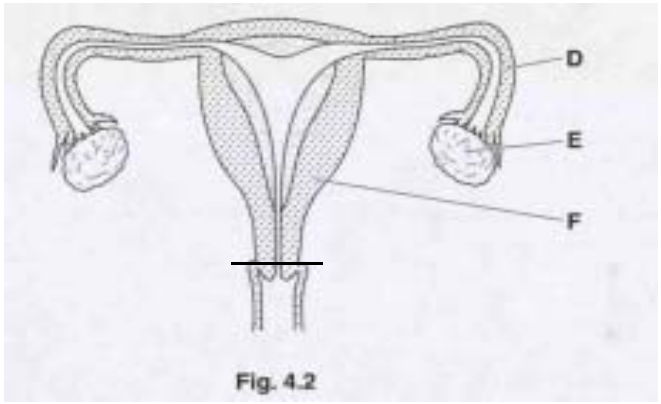
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(ii)	*cause:* blocked coronary artery / AW **;** high fat diet / high cholesterol / high stress levels / smoking / sedentary life style **;** *explanation:* heart muscle / tissue, receives insufficient blood / AW **;** heart muscle / tissue, receives insufficient oxygen / glucose **;** respiration limited **;** insufficient / poor, energy released **;** heart (muscle) can't contract sufficiently (to support exercise) **;**	[max 3] **[Total: 11]**	award max 2 marks for each of cause and explanation
3 (a)	protein **;** catalysts **;** speed up **;**	[3]	
(b) (i)	(ph) 7.5 **;**	[1]	**A** 7.3 – 7.7
(ii)	4 (min) **;**	[1]	**A** 3.9 – 4.1
(iii)	hydrochloric acid / stomach, has a low pH / pH ⩽ 4 **;** (amylase) enzyme, is denatured / destroyed / will not function / AW **;** (amylase) enzyme in saliva works best in neutral / ph 7.5 **;**	[max 2]	**R** 'kills enzyme' ecf from graph reading

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(iv)	amylase ; salivary glands / pancreas / small intestine ;	[2]	
(c)	temperature ;	[1] **[Total: 10]**	**A** presence of an inhibitor / heat
4 (a)		[3]	1 mark each correct line more than one line from any box negates that mark
(b) (i)	idea that cilia beat / move / wave, away from lungs ; remove dust / microorganisms ; reference to mucus ; keep airway clear ;	[max 2]	**A** hairs for cilia **A** cleans the air going to the lungs
(ii)	move the egg cell (from ovary to uterus) ;	[1]	

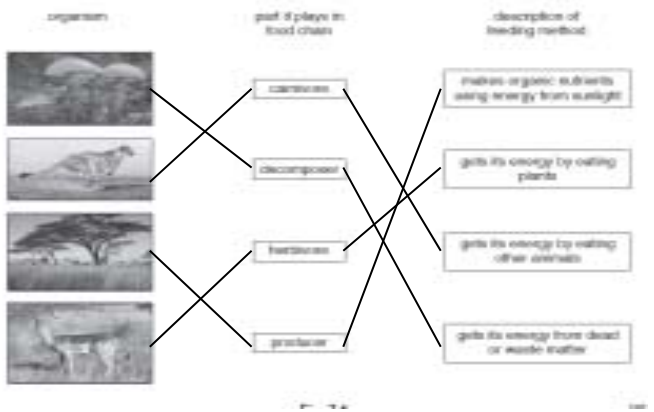
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(c) (i)	D = oviduct ; E = ovary ; F = uterus ;	[3]	
(ii)	Centre of **X** must be in the cavity below the line on Fig.4.2 ;  Fig. 4.2	[1]	
(d)	sperm can swim / move ; towards egg (and fertilise it) ;	[2] **[Total: 12]**	

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5 (a)	<table><tr><th>diffusion</th><th>osmosis</th></tr><tr><td>X</td><td>✓ ;</td></tr><tr><td>✓</td><td>X ;</td></tr><tr><td>✓</td><td>✓ ;</td></tr><tr><td>X</td><td>X ;</td></tr></table>	[4]	1 mark for each correct row
(b)	movement (of oxygen) from high to low concentration ; random movement of particles ; (identification of this as) diffusion ; water acting as solvent ;	[max 2] **[Total: 6]**	
6 (a)	wind ; animal ; water ;	[max 1]	**A** any named animal / type of animal
(b)	colonise new habitats ; prevent overcrowding / have more space ; reduce competition (with other plants of same species) ;	[max 1]	**A** grow in a new / different place **A** to move the seeds away from the plant

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(c)	*how fruits are dispersed:* wind / idea of blown about **;** *reason:* fruits / seeds easily detached **;** large surface area to catch wind **;** light weight idea **;** hairs act as parachute **;**	[max 2]	1 mark for method of dispersal and 1 mark for reason
(d)	water / moist / damp **;** oxygen **;** warmth / suitable temperature **;**	[3] **[Total: 7]**	**R** light **R** minerals / food / nutrients **A** suitable pH
7 (a)		[max 6]	*lines between organism and part played:* 4 correct = 3 2 or 3 correct = 2 1 correct = 1 *lines between part played and description:* 4 correct = 3 2 or 3 correct = 2 1 correct = 1

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	(b)	position of a (named) organism(s) in a, food chain / food web / pyramid of number / pyramid of biomass / pyramid of energy ;	[1] **[Total: 7]**	
8	**(a) (i)**	group of organisms of, one / same / (named) species ; living in the same place (at the same time) ;	 [2]	
	(ii)	4300 <u>million</u> ;	[1]	
	(b)	*pattern:* (both graphs) show an increase / rate of growth speeding up ; big increase from 1800 / 1900 onwards ; *explanation:* improved health care ; improved housing ; people living longer ; increased wealth ; more efficient food production / use of fertilisers / pesticides / mechanisation / genetics in crops ; improved food storage / distribution ; potable water supplies ; improved sanitation ; AVP ; eg migration / increase in birth rate	 [max 3]	

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(c)	war ; famine ; drought ; (named) disease ; natural disaster ; migration ; introduction of contraceptives ; pollution / contamination qualified ; decrease in medical care ;	[max 2]	**A** introduction of restrictions on size of family **A** increase in death rate / decrease in birth rate
(d) (i)	number of seabirds has, increased / gone up (by 40%), and decreased after 2000 ; number of woodland birds has decreased / gone down (by 20%) ;	[2]	
(ii)	deforestation ; loss of habitat ; loss of nesting sites ; less cover available ; disease ; lack of food ; bad weather ; increased predation ; increased competition ; AVP ;	[max 1]	
(iii)	genetic resource ; useful resource ; maintains food chain / web ; (conserve habitat) to maintain biodiversity ; idea of aesthetic value ; AVP ; e.g. avoids extinction	[max 2] **[Total: 13]**	

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9 (a) (i)	passed from parents to offspring / passed on in the genes / passed on in eggs or sperm **;**	[1]	
(ii)	*dominant:* idea that it is the characteristic that is always seen in the outward appearance (phenotype) **;** *allele:* an alternative form of a gene **;**	[2]	
(b) (i)	*C* *D* *parental phenotypes:* club thumb × normal thumb **;** *parental genotypes:* *Tt* × tt **;** *gametes:* (T) (t) × (t) (t) **;** *genotypes of children:* Tt tt Tt tt **;** *phenotypes of children:* club normal club normal **;** *ratio:* 1 (clubbed) : 1 (normal) **;**	[6]	**A** tT ie recessive allele first **A** other expressions of ratio 2:2 / ½ : ½ / 50% : 50% / even
(ii)	none of B's children have normal thumbs / all of the children have club thumbs **;**	[1] **[Total: 10]**	
		Paper [Total: 80]	

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