UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

0610 BIOLOGY

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

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

General notes

Do not exceed the section sub-totals or question maxima.

Symbols used in mark scheme and guidance notes.

/ separates alternatives for a marking point

; separates points for the award of a mark

MP mark point – used in guidance notes when referring to numbered marking points

ORA or reverse argument/reasoning

OWTTE or words to that effect

A accept – as a correct response

R reject – this is marked with a cross and any following correct statements do not gain any marks

I ignore/irrelevant/inadequate – this response gains no mark, but any following correct answers can gain marks.

( ) the word/phrase in brackets is not required to gain marks but sets the context of the response for credit.
e.g. (waxy) cuticle. Waxy not needed but if it was described as a cellulose cuticle then no mark is awarded.

<u>mitosis</u> underlined words – this word only

1 **(a)** **(i)** lime water / hydrogencarbonate indicator; [1]	A – bicarbonate indicator	
(ii) respiration; excretion; [2]	I – ref. to decomposition	
(b) growth; sensitivity / irritability; movement; nutrition; reproduction; any three – 1 mark each [3]	A – respiration, excretion if not credited in **(a)(ii)** A – OWTTE for any of the characteristics	
[Total: 6]		

2 (a) (i) 1 male has larger body to maintain / repair; 2 more likely to do physical work (so more wear and tear) / OWTTE; 3 male has higher metabolic rate; any two – 1 mark each [2]	I – male does more work, works harder	
(ii) breast feeding female needs energy for herself; and for the (energy needs of) baby; [2]	A – more needed to move around, more needed for milk production A – infant, child	
(b) (i) 1 both have same need for body repair / maintenance as average female / OWTTE; 2 pregnant female needs additional for fetus; 3 breast feeding female needs additional for milk; 4 baby / fetus is growing; any three – 1 mark each [3]	A – suckling, feeding baby	
(ii) 1 males have more growth than females in this period; 2 effect of slightly later growth spurt / puberty; 3 effect of final larger body skeleton / muscles; 4 higher wear and tear / maintenance; any two – 1 mark each [2]	A – growth slows earlier in girls, OWTTE	
(c) menstruation / OWTTE; [1]	A – more blood has to be produced	
[Total: 10]		

3 (a) (i) **A** – epidermis; **B** – (hair) erector muscle; **C** – capillaries; **D** – sweat gland; [4]	A – cornified layer, dead cells A – blood vessels I – vein, artery
(ii) touch; pressure; temperature change / heat / cold; pain; any two – 1 mark each [2]	
(b) 1 release sweat; 2 evaporation of water (in sweat); 3 needs heat from body; 4 cools blood / body; 5 rate of sweating can be varied depending on body temperature; any three – 1 mark each [3]	
[Total: 9]	

4	(a) (i)	**E** – urethra; **F** – vagina; **G** – anus; [3]	A – birth canal A – rectum
	(ii)	<u>ovaries</u> 1 production / release of ova / female gametes; 2 production / release of oestrogen; 3 production / release of progesterone; any two – 1 mark each [2]	A – egg cells A – production, release of female hormones if neither hormone named
		<u>oviducts</u> 1 passageway for ovum to reach uterus; 2 moved along by cilia / ciliated tissue / peristalsis; 3 usual site of fertilisation; any two – 1 mark each [2]	A – egg cell
	(b) (i)	surgical removal of ovaries / uterus or cutting / ligaturing oviducts; [1]	A – tying
	(ii)	prevents female body fluids coming in contact with male tissue / male body fluids coming in contact with female tissue; [1]	A – ref. to causative agent in lieu of body fluid A – named example
	(iii)	contraceptive pill / spermicide; prevents ovulation / prevents implantation / kills sperm [2]	A – morning after pill, contraceptive patch / implant / injection
		[Total: 11]	

5 (a)

	continuous variation	*discontinuous variation*
example of variation in humans	height / mass;	blood group / ear lobe shape / eye colour;
factors that influence variation	genes and environment;	genes (only);

[4]

A – other relevant examples

A – specific environmental factors

(b) (i) a gene is a length of DNA / is a unit of inheritance / is code for a protein;
an allele is any of 2 or more alternative forms of a gene; [2]

A – variations, variants

(c) diploid nucleus formed by mitosis, haploid by meiosis;
diploid nucleus has twice the chromosomes of haploid;
body cells are diploid, gametes are haploid; [3]

A – genes, genetic material
A – any correct named examples

[Total: 9]

6	(a) (i)	diffusion;	[1]	A – active uptake, active transport;
	(ii)	xylem;	[1]	I – vascular tissue
	(b) (i)	through the villi; in small intestine / ileum;	[2]	
	(ii)	vitamin D;	[1]	A – calciferol
	(iii)	bones / teeth;	[1]	A – enamel, dentine, named bone or tooth
	(iv)	in milk / when suckling;	[1]	A – ref. to passage across placenta to fetus
	(c)	1 sheep releases energy; 2 by respiration; 3 for use in body activities; 4 e.g. chemical reactions / movement / passage of nerve impulses etc; 5 to replace lost heat / maintain body temperature; 6 as sheep warmer than environment; 7 not all grass digested / not all products of digestion absorbed; 8 lost in faeces / urine; 9 energy trapped / retained in sheep's tissues; any four – 1 mark each		A – lost in milk taken by humans
			[Total: 11]	

7 **(a)** **(i)** 1 keep out pathogens; 2 keep in water / reduce loss of water; 3 because it is impermeable to water; 4 transparent so lets light through; any two – 1 mark each [2]		A – transparent so lets light to palisade cells / photosynthesising cells
(ii) 1 diffusion (of carbon dioxide); 2 from higher to lower concentration / down concentration gradient; 3 through stomata; 4 through air spaces; any two – 1 mark each [2]		A – diffuse through cell membrane / through spaces in cell wall
(b) light (intensity); temperature; [2] **[Total: 6]**		A – colour of light / AW, amount of light A – wilting / AW I – water supply

8 (a) (i) a unit containing all the organisms;
and their environment that interact together; [2]

(ii) producer – organism that makes its own nutrients / food;
consumer – organism that gets its energy by feeding on other organisms; [2]

A – uses sunlight for photosynthesis, photosynthesises
A – gets organic nutrients from other organisms, reliant on producers

(b)

hibiscus →	beetle →	tarantula →	snake → hawk
mango →	beetle →	tarantula →	snake → hawk
mango →	caterpillar →	tarantula →	snake → hawk
mango →	caterpillar →	frog →	snake → hawk
grass →	grasshopper →	tarantula →	snake → hawk
grass →	grasshopper →	rat →	snake → hawk
grass →	snail →	rat →	snake → hawk

A – spider for tarantula

If drawn as a pyramid can gain MP1 and 2

in each example –
1 five (and only five) organisms quoted starting with a producer and end with hawk;
2 organisms in correct sequence and from food web;
3 arrows in correct direction of energy flow; [3]

(c) snake population falls / decreases;
less food for frogs / tarantulas;
therefore less tarantulas / frogs for snakes to eat;
less food for kiskedee / bird;
less food for hawks;
hawks eat more snakes;

A – spider for tarantula

A – logical sequence involving less hibiscus eaten by beetles, more food for aphids, for ladybirds, for frogs, more food for snakes, population rises

any four – 1 mark each [4]

	(d) could kill useful insects; e.g. pollinators / predators of other pests; can accumulate in food chain / ref to bioaccumulation; sterility / death of top carnivores / hawk; any two – 1 mark each [2] **[Total: 13]**	A – kills food of kiskedee, rat
9	**(a)** made of protein; functions as a biological catalyst / speeds up chemical reactions in organisms; [2] **(b)** lactase could be coagulated / denatured in stomach; because of very low / acidic pH; as it normally works in alkaline conditions in small intestine; protease in stomach may digest it; any three – 1 mark each [3] **[Total: 5]**	A – not used up in reaction