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.

UNIVERSITY of CAMBRIDGE
International Examinations

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] **(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]**	A – cornified layer, dead cells A – blood vessels I – vein, artery

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;

any four – 1 mark each [4]

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

	(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]	A – not used up in reaction
	(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]**	