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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.

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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

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1 (a) (i) lime water / hydrogencarbonate indicator; [1] (ii) respiration; [2] excretion; (b) growth; sensitivity / irritability; movement; nutrition; reproduction; any three – 1 mark each [3] [Total: 6]	A – bicarbonate indicator I – ref. to decomposition A – respiration, excretion if not credited in (a)(ii) A – OWTTE for any of the characteristics
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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] (ii) breast feeding female needs energy for herself; and for the (energy needs of) baby; [2] (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] (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] (c) menstruation / OWTTE; [1] [Total: 10]	I – male does more work, works harder A – more needed to move around, more needed for milk production A – infant, child A – suckling, feeding baby A – growth slows earlier in girls, OWTTE A – more blood has to be produced
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Page 5	Mark Scheme: Teachers' version	Syllabus	Paper
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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
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Page 6	Mark Scheme: Teachers' version	Syllabus	Paper
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4 (a) (i) E – urethra; F – vagina; G – anus; [3] (ii) ovaries 1 production / release of ova / female gametes; 2 production / release of oestrogen; 3 production / release of progesterone; any two – 1 mark each [2] <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] (b) (i) surgical removal of ovaries / uterus or cutting / ligaturing oviducts; [1] (ii) prevents female body fluids coming in contact with male tissue / male body fluids coming in contact with female tissue; [1] (iii) contraceptive pill / spermicide; prevents ovulation / prevents implantation / kills sperm [2] [Total: 11]	A – birth canal A – rectum A – egg cells A – production, release of female hormones if neither hormone named A – egg cell A – tying A – ref. to causative agent in lieu of body fluid A – named example A – morning after pill, contraceptive patch / implant / injection
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5 (a)

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

[4]

- (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]

- (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]

[Total: 9]

A – other relevant examples

A – specific environmental factors

A – variations, variants

A – genes, genetic material

A – any correct named examples

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6 (a) (i) diffusion; [1] (ii) xylem; [1] (b) (i) through the villi; in small intestine / ileum; [2] (ii) vitamin D; [1] (iii) bones / teeth; [1] (iv) in milk / when suckling; [1] (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 [Total: 11]	A – active uptake, active transport; I – vascular tissue A – calciferol A – enamel, dentine, named bone or tooth A – ref. to passage across placenta to fetus A – lost in milk taken by humans
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Page 9	Mark Scheme: Teachers' version	Syllabus	Paper
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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] (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] (b) light (intensity); temperature; [2] [Total: 6]	A – transparent so lets light to palisade cells / photosynthesising cells A – diffuse through cell membrane / through spaces in cell wall A – colour of light / AW, amount of light A – wilting / AW I – water supply
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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] (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 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 kiskadee / bird; less food for hawks; hawks eat more snakes; any four – 1 mark each [4]	A – uses sunlight for photosynthesis, photosynthesises A – gets organic nutrients from other organisms, reliant on producers A – spider for tarantula If drawn as a pyramid can gain MP1 and 2 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
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(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 kiskadee, 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