

**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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<p><b>1 (a) (i)</b> lime water / hydrogencarbonate indicator;</p> <p><b>(ii)</b> respiration; excretion;</p> <p><b>(b)</b> growth; sensitivity / irritability; movement; nutrition; reproduction;</p> <p>any three – 1 mark each</p>	<p>[1]</p> <p>[2]</p> <p>[3]</p> <p><b>[Total: 6]</b></p>	<p>A – bicarbonate indicator</p> <p>I – ref. to decomposition</p> <p>A – respiration, excretion if not credited in <b>(a)(ii)</b></p> <p>A – OWTTE for any of the characteristics</p>
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<p><b>2 (a) (i)</b> 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;</p> <p>any two – 1 mark each [2]</p> <p><b>(ii)</b> breast feeding female needs energy for herself;                  and for the (energy needs of) baby; [2]</p> <p><b>(b) (i)</b> 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;</p> <p>any three – 1 mark each [3]</p> <p><b>(ii)</b> 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;</p> <p>any two – 1 mark each [2]</p> <p><b>(c)</b> menstruation / OWTTE; [1]</p> <p style="text-align: right;"><b>[Total: 10]</b></p>	<p>I – male does more work, works harder</p> <p>A – more needed to move around, more needed for milk production                  A – infant, child</p> <p>A – suckling, feeding baby</p> <p>A – growth slows earlier in girls, OWTTE</p> <p>A – more blood has to be produced</p>
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<p><b>3 (a) (i)</b> A – epidermis;          B – (hair) erector muscle;          C – capillaries;            D – sweat gland; [4]</p> <p><b>(ii)</b> touch;          pressure;          temperature change / heat / cold;          pain;            any two – 1 mark each [2]</p> <p><b>(b)</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]</p> <p style="text-align: right;"><b>[Total: 9]</b></p>	<p>A – cornified layer, dead cells</p> <p>A – blood vessels          I – vein, artery</p>
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<p><b>4 (a) (i)</b> E – urethra; F – vagina; G – anus;</p> <p style="text-align: right;">[3]</p> <p><b>(ii) ovaries</b> 1 production / release of ova / female gametes; 2 production / release of oestrogen; 3 production / release of progesterone;</p> <p>any two – 1 mark each</p> <p style="text-align: right;">[2]</p> <p><b>oviducts</b> 1 passageway for ovum to reach uterus; 2 moved along by cilia / ciliated tissue / peristalsis; 3 usual site of fertilisation;</p> <p>any two – 1 mark each</p> <p style="text-align: right;">[2]</p> <p><b>(b) (i)</b> surgical removal of ovaries / uterus or cutting / ligaturing oviducts;</p> <p style="text-align: right;">[1]</p> <p><b>(ii)</b> prevents female body fluids coming in contact with male tissue / male body fluids coming in contact with female tissue;</p> <p style="text-align: right;">[1]</p> <p><b>(iii)</b> contraceptive pill / spermicide; prevents ovulation / prevents implantation / kills sperm</p> <p style="text-align: right;">[2]</p> <p style="text-align: right;"><b>[Total: 11]</b></p>	<p>A – birth canal A – rectum</p> <p>A – egg cells A – production, release of female hormones if neither hormone named</p> <p>A – egg cell</p> <p>A – tying</p> <p>A – ref. to causative agent in lieu of body fluid A – named example</p> <p>A – morning after pill, contraceptive patch / implant / injection</p>
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<b>5 (a)</b>			
	<i>continuous variation</i>	<i>discontinuous variation</i>	
<i>example of variation in humans</i>	height / mass;	blood group / ear lobe shape / eye colour;	A – other relevant examples
<i>factors that influence variation</i>	genes and environment;	genes (only);	A – specific environmental factors
			[4]
<b>(b) (i)</b>	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
<b>(c)</b>	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
			<b>[Total: 9]</b>

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<b>6</b>	<b>(a) (i)</b> diffusion;	[1]	A – active uptake, active transport;
	<b>(ii)</b> xylem;	[1]	I – vascular tissue
	<b>(b) (i)</b> through the villi; in small intestine / ileum;	[2]	
	<b>(ii)</b> vitamin D;	[1]	A – calciferol
	<b>(iii)</b> bones / teeth;	[1]	A – enamel, dentine, named bone or tooth
	<b>(iv)</b> in milk / when suckling;	[1]	A – ref. to passage across placenta to fetus
	<b>(c)</b> 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;		A – lost in milk taken by humans	
9 energy trapped / retained in sheep's tissues;			
any four – 1 mark each			
	<b>[Total: 11]</b>		



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<p><b>7 (a) (i)</b></p> <ol style="list-style-type: none"> <li>1 keep out pathogens;</li> <li>2 keep in water / reduce loss of water;</li> <li>3 because it is impermeable to water;</li> <li>4 transparent so lets light through;</li> </ol> <p>any two – 1 mark each [2]</p> <p><b>(ii)</b></p> <ol style="list-style-type: none"> <li>1 diffusion (of carbon dioxide);</li> <li>2 from higher to lower concentration / down concentration gradient;</li> <li>3 through stomata;</li> <li>4 through air spaces;</li> </ol> <p>any two – 1 mark each [2]</p> <p><b>(b)</b> light (intensity); temperature; [2]</p> <p style="text-align: right;"><b>[Total: 6]</b></p>	<p>A – transparent so lets light to palisade cells / photosynthesising cells</p> <p>A – diffuse through cell membrane / through spaces in cell wall</p> <p>A – colour of light / AW, amount of light A – wilting / AW I – water supply</p>
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<p><b>8 (a) (i)</b> a unit containing all the organisms; and their environment that interact together; [2]</p> <p><b>(ii)</b> producer – organism that makes its own nutrients / food; consumer – organism that gets its energy by feeding on other organisms; [2]</p> <p><b>(b)</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</p> <p>in each example –</p> <ol style="list-style-type: none"> <li>1 five (and only five) organisms quoted starting with a producer and end with hawk;</li> <li>2 organisms in correct sequence and from food web;</li> <li>3 arrows in correct direction of energy flow; [3]</li> </ol> <p><b>(c)</b> 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;</p> <p>any four – 1 mark each [4]</p>	<p>A – uses sunlight for photosynthesis, photosynthesises A – gets organic nutrients from other organisms, reliant on producers</p> <p>A – spider for tarantula</p> <p>If drawn as a pyramid can gain MP1 and 2</p> <p>A – spider for tarantula</p> <p>A – logical sequence involving less hibiscus eaten by beetles, more food for aphids, for ladybirds, for frogs, more food for snakes, population rises</p>
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<p><b>(d)</b> 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;</p> <p>any two – 1 mark each [2]</p> <p><b>[Total: 13]</b></p>	<p>A – kills food of kiskedee, rat</p>
<p><b>9 (a)</b> made of protein; functions as a biological catalyst / speeds up chemical reactions in organisms; [2]</p> <p><b>(b)</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;</p> <p>any three – 1 mark each [3]</p> <p><b>[Total: 5]</b></p>	<p>A – not used up in reaction</p>