UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

0610 BIOLOGY

0610/02 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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UNIVERSITY of CAMBRIDGE
International Examinations

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	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	name of arthropod
A											
B	✓		✓		✓						Anopheles;
C		✓						✓			Ornithodorus;
D		✓					✓		✓		Pulex;
E	✓			✓							Musca;
F	✓		✓			✓					Periplaneta;

Each correct row, ticks + name, – 1 mark each [5]

[Total: 5]

If **all** five names are correct but **no** ticks in grid - MAX 3
If **all** five names are correct with **no wrong** ticks but some correct ticks missing – MAX 4

A – correct row, ticks + common names e.g. mosquito, tick, flea, fly / housefly, cockroach – 1 mark each

I – crosses

R – ticks in wrong boxes

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2	**(a)** because they are toxic / poisonous;	[1]	A – harmful R – refs to bacteria etc
	(b) **(i)** ureter;	[1]	
	(ii) (urinary) bladder;	[1]	R – gall bladder
	(iii) renal vein;	[1]	A – vena cava
	(c) 1 filter (from the blood) / ultrafiltration; 2 plasma /soluble / dissolved substances / named examples; 3 reabsorption; 4 of useful substances / named example; 5 remainder becomes / forms urine; Any three – 1 mark each	[3]	Need 2 or more correct named examples
	(d) **(i)** liver;	[1]	
	(ii) urea;	[1]	A – ammonia / ammonium
		[Total: 9]	

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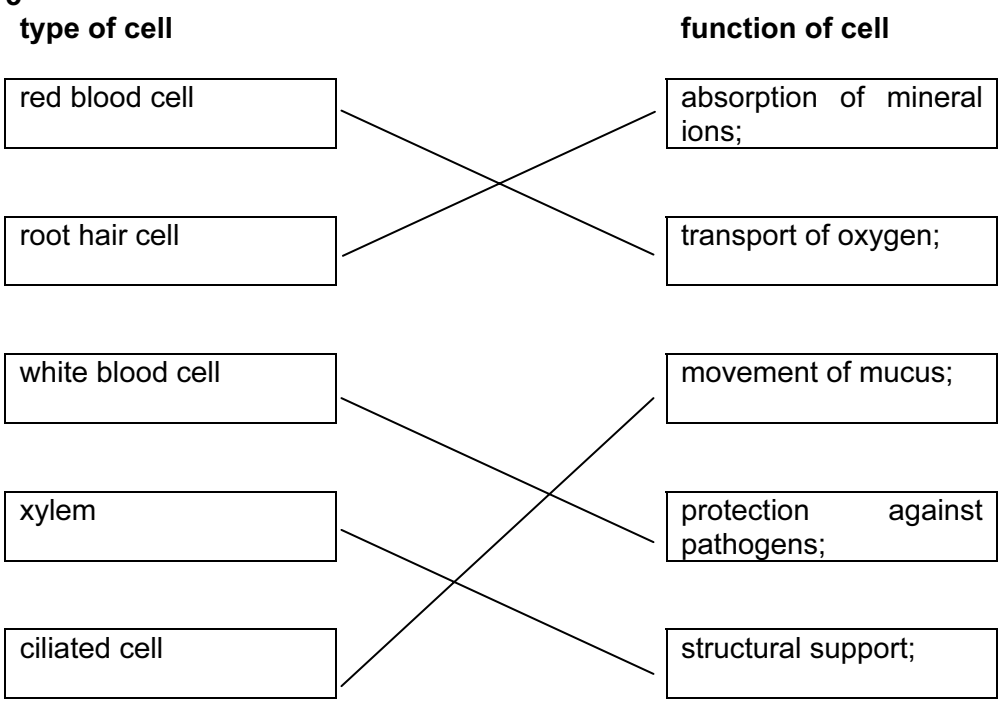
3 **(a)** **(i)**	1 pollination is the transfer of pollen to the stigma; 2 fertilisation is the fusion / joining of male and female / two gametes; 3 pollination needs a transfer agent, fertilisation does not / only pollination needs transfer agent; 4 pollination occurs before fertilisation / fertilisation cannot happen without pollination; 5 pollination is external (to the plant) and fertilisation is internal; Any three – 1 mark [3]	A – male gamete for pollen A – movement or carriage for transfer / AW e.g. deposited on / arrives at I – carpel R – refs to ovum / sperm A – named transfer agent
(ii)	stigma; [1]	I – carpel / pistil
(iii)	ovule; [1]	A – ovary / embryo sac
(b)	(seed from) ovule; (fruit from) ovary; [2]	I – zygote / embryo
(c)	(wind can) carry pollen / assists in pollination / OWTTE; (wind can) disperse seeds / fruits / OWTTE; (wind can) disperse scent (to attract pollinators); Any two – 1 mark each [2]	
	[Total: 9]	

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4	(a) (i)	heat; [1]	A – thermal (energy) / kinetic (energy) I – sunlight / solar energy
	(ii)	condensation / cooling of water vapour; [1]	
	(b) (i)	transpiration / evapo-transpiration; [1]	A – evaporation from trees / plants
	(ii)	1 humidity; 2 temperature; 3 wind / air movement; 4 light / sunlight; Any three – 1 mark each [3]	A – drier / moister climate / weather I – rainfall A – hotter / cooler climate / weather I – heat / warmth I – sun / solar energy In **(ii)** I – qualifications
	(c) (i)	1 reduced transpiration (in forest area); 2 leading to less water vapour (moving inland) / less clouds form; 3 thus less / no rainfall / less humid (inland); Any two – 1 mark each [2]	Beware responses which would gain marks in **(c) (ii)** Watch context. R – over the sea A – drier climate (inland)
	(ii)	1 more surface runoff of rain water / flooding; 2 increased surface wind speed; 3 can result in greater erosion of soil / silting up of streams / rivers / landslides; 4 desertification; 5 destruction of habitats / disrupt food chains / OWTTE; 6 possible extinction of animal / plant species; 7 more carbon dioxide / less oxygen in atmosphere / OWTTE; Any two – 1 mark each [2]	A – animals lose their homes A – decreased biodiversity I – animals die (unqualified) R – no oxygen
		[Total: 10]	

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Each correct line – 1 mark each [5]

[Total: 5]

Award marks based on origins of lines
2 or more lines from a type of cell – no mark with the exception of 2 lines from the ciliated cell joining with movement of mucus and protection against pathogens

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6 (a) (i)

tube	colour of indicator at start	colour of indicator after 6 hours
A	*pinky red*	yellow;
B	*pinky red*	yellow;
C	*pinky red*	yellow;
D	*pinky red*	purple;

[4]

I – pH values
R – other colours
I – qualifications of the three colours such as light / dark

(ii) <u>tube A</u>
1 respiration occurs;
2 carbon dioxide produced / added to water;
3 becomes acidic / more acidic / pH falls;

A – carbon dioxide in water increases

<u>tube D</u>
4 photosynthesis occurs;
5 carbon dioxide removed from water;
6 becomes alkaline / less acidic / pH rises;

I – all refs to oxygen
A – carbon dioxide in water decreases

Any four – 1 mark each [4]

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(b) <u>tube E</u>	Mark predicted colour first. Explanation (MP2 and 3) must relate to the predicted colour. No colour or rejected colour – no marks
1 colour stays pinky red / does not change; 2 respiration and photosynthesis balance out / OWTTE; 3 carbon dioxide amount in water / pH does not change; **OR** 1 colour goes purple; 2 photosynthesis more than respiration / OWTTE; 3 carbon dioxide amount in water drops / pH rises; **OR** 1 colour goes yellow; 2 respiration more than photosynthesis / OWTTE; 3 carbon dioxide amount in water rises / pH falls; Any one prediction – 3 marks [3] **[Total: 11]**	A – responses worded in terms of use / production of carbon dioxide A – level / concentration for amount See note above See note above See note above See note above

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7	**(a)**	1 receptor / sensory; 2 stimuli; 3 tongue; 4 nose; [4]	A – sense (cells) A – stimulus MP3 & MP4 in either order I – mouth / taste buds / olfactory cells / chemoreceptors
	(b) **(i)**	suspensory ligaments; [1]	
	(ii)	becomes flatter / thinner / less curved / convex / rounded; [1]	A – less fat R – concave I – wider /smaller / larger
	(c) **(i)**	5; [1]	
	(ii)	2; [1]	
	(iii)	4; [1]	
		[Total: 9]	

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8	**(a)**		A – appropriate words for letters If line ends in arrowhead / cross then point / centre of cross must be correctly positioned on structure. Treat arrows pointing towards letter / word as simple lines
	(i) label **G** clearly indicating testis;	[1]	R – line to epididymis
	(ii) label **S** clearly indicating sperm duct;	[1]	A – any point on the duct as shown in Fig. 8.1 prior to junction in prostate gland
	(iii) label **T** clearly indicating testis;	[1]	R – line to epididymis
	(iv) label **U** clearly indicating urethra;	[1]	
	(b) 1 (stimulate) production of sperm; 2 growth / development of pubic / axillary hair; 3 growth / development of facial / body hair; 4 breaking of the voice / OWTTE; 5 widening of shoulder (girdle); 6 development of more muscle / more muscular; 7 increased aggressive behaviour / OWTTE; 8 growth of penis / testes; Any two – 1 mark each	[2]	MP2&3 R – hair unqualified MP2&3 No credit for ref. to hair on scalp MP4 I – change of voice A – broader shoulders MP8 I – enlargement (could be ref to erection)
	(c) <u>meiosis</u>; four; haploid; half;	[4]	Only accept terms from the list I – "N / n"
		[Total: 10]	

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9	(a) (i)	nitrates / ammonium / magnesium / phosphates / potassium; **Any two – total 1 mark** [1]	I – nitrogen / ammonia / phosphorus A – correct ionic chemical symbols
	(ii)	1 leaching / runoff into stream; 2 ref to eutrophication; 3 excessive algal growth / OWTTE; 4 light to lower layers cut off / reduced light below surface; 5 (submerged) plants die; 6 bacteria thrive / reproduce / multiply / OWTTE; 7 (bacteria) use up oxygen (for respiration / decay); 8 anaerobic conditions occur / aquatic animals die / emigrate; Any four – 1 mark each [4]	must be in correct context
	(iii)	reduces numbers of weeds / unwanted plants; crop has less competition (with weeds); for light; for water; for minerals / salts / named example; Any three – 1 mark each [3]	I – refs to insects / other animals / pests I – ref to improved crop yield I – ref to food / nutrients
	(iv)	1 may destroy (useful) species / OWTTE; 2 e.g. pollinators / predators / named example; 3 causes disruption of food chains; 4 (pesticide) may accumulate in food chain; 5 allow other species to flourish and become pests / OWTTE; Any two – 1 mark each [2]	
	(b)	(artificial selection) humans choose which individuals (with desired features) to interbreed; (genetic engineering) <u>genes / alleles / DNA</u> within cells are modified / changed / altered / replaced / inserted in an organism; [2]	
		[Total:12]	

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