

**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.

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

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

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	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	name of arthropod
<b>A</b>											
<b>B</b>	✓		✓		✓						Anopheles;
<b>C</b>		✓						✓			Ornithodorus;
<b>D</b>		✓					✓		✓		Pulex;
<b>E</b>	✓			✓							Musca;
<b>F</b>	✓		✓			✓					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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<p><b>2 (a)</b> because they are toxic / poisonous;</p> <p><b>(b) (i)</b> <u>ureter</u>;</p> <p style="padding-left: 20px;"><b>(ii)</b> (urinary) bladder;</p> <p style="padding-left: 20px;"><b>(iii)</b> renal vein;</p> <p><b>(c)</b> 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</p> <p><b>(d) (i)</b> liver;</p> <p style="padding-left: 20px;"><b>(ii)</b> urea;</p>	<p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[3]</p> <p>[1]</p> <p>[1]</p> <p><b>[Total: 9]</b></p>	<p>A – harmful R – refs to bacteria etc</p> <p></p> <p>R – gall bladder</p> <p>A – vena cava</p> <p>Need 2 or more correct named examples</p> <p></p> <p>A – ammonia / ammonium</p>
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<p><b>3 (a) (i)</b> 1 pollination is the transfer of pollen to the stigma;</p> <p>2 fertilisation is the fusion / joining of male and female / two gametes;</p> <p>3 pollination needs a transfer agent, fertilisation does not / only pollination needs transfer agent;</p> <p>4 pollination occurs before fertilisation / fertilisation cannot happen without pollination;</p> <p>5 pollination is external (to the plant) and fertilisation is internal;</p> <p>Any three – 1 mark</p>	[3]	<p>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</p>
<p><b>(ii)</b> stigma;</p>	[1]	I – carpel / pistil
<p><b>(iii)</b> ovule;</p>	[1]	A – ovary / embryo sac
<p><b>(b)</b> (seed from) ovule;  (fruit from) ovary;</p>	[2]	I – zygote / embryo
<p><b>(c)</b> (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</p>	[2]	
<p><b>[Total: 9]</b></p>		

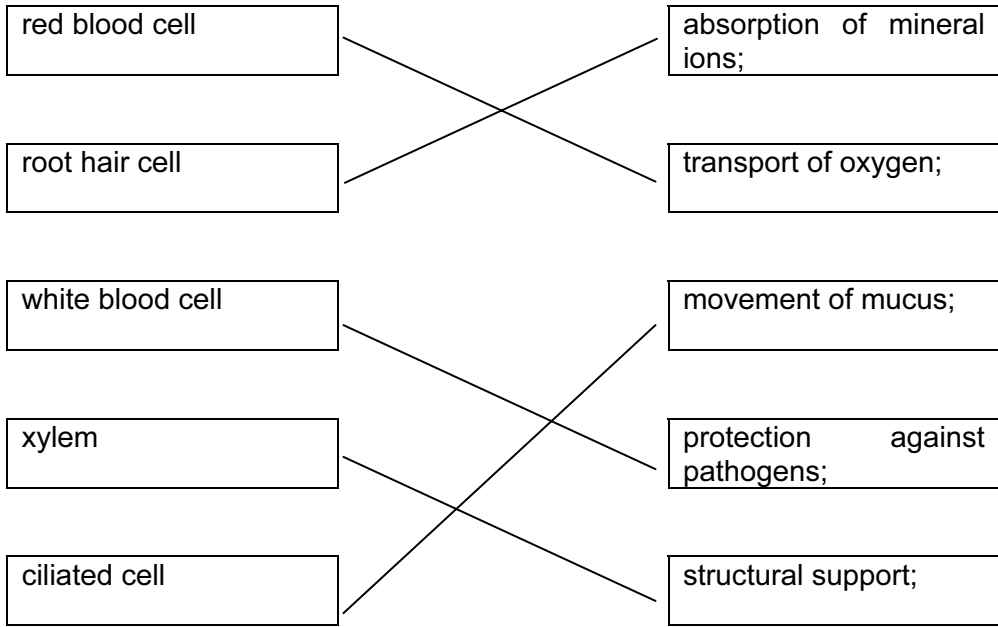
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4	(a) (i) heat;	[1]	A – thermal (energy) / kinetic (energy) I – sunlight / solar energy
	(ii) condensation / cooling of water vapour;	[1]	
	(b) (i) transpiration / evapo-transpiration;	[1]	A – evaporation from trees / plants
	(ii) 1 humidity;		A –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

**5**

**type of cell**

**function of cell**



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	<i>pinky red</i>	yellow;
B	<i>pinky red</i>	yellow;
C	<i>pinky red</i>	yellow;
D	<i>pinky red</i>	purple;

(ii) tube A

- 1 respiration occurs;
- 2 carbon dioxide produced / added to water;
- 3 becomes acidic / more acidic / pH falls;

tube D

- 4 photosynthesis occurs;
- 5 carbon dioxide removed from water;
- 6 becomes alkaline / less acidic / pH rises;

Any four – 1 mark each

[4]

[4]

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

A – carbon dioxide in water increases

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

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<p><b>(b) <u>tube E</u></b></p> <p>1 colour stays pinky red / does not change; 2 respiration and photosynthesis balance out / OWTTE;</p> <p>3 carbon dioxide amount in water / pH does not change; <b>OR</b> 1 colour goes purple; 2 photosynthesis more than respiration / OWTTE; 3 carbon dioxide amount in water drops / pH rises; <b>OR</b> 1 colour goes yellow; 2 respiration more than photosynthesis / OWTTE; 3 carbon dioxide amount in water rises / pH falls; Any one prediction – 3 marks</p> <p style="text-align: right;">[3]</p> <p style="text-align: right;"><b>[Total: 11]</b></p>	<p>Mark predicted colour first. Explanation (MP2 and 3) must relate to the predicted colour. No colour or rejected colour – no marks</p> <p>A – responses worded in terms of use / production of carbon dioxide A – level / concentration for amount</p> <p>See note above See note above</p> <p>See note above See note above</p>
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<p><b>7 (a)</b> 1 receptor / sensory; 2 stimuli; 3 tongue; 4 nose;</p>	[4]	<p>A – sense (cells) A – stimulus MP3 &amp; MP4 in either order I – mouth / taste buds / olfactory cells / chemoreceptors</p>
<p><b>(b) (i)</b> suspensory ligaments;</p>	[1]	
<p><b>(ii)</b> becomes flatter / thinner / less curved / convex / rounded;</p>	[1]	<p>A – less fat R – concave I – wider /smaller / larger</p>
<p><b>(c) (i)</b> 5;</p>	[1]	
<p><b>(ii)</b> 2;</p>	[1]	
<p><b>(iii)</b> 4;</p>	[1]	
<b>[Total: 9]</b>		

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<p><b>8 (a)</b></p> <p>(i) label <b>G</b> clearly indicating testis;</p> <p>(ii) label <b>S</b> clearly indicating sperm duct;</p> <p>(iii) label <b>T</b> clearly indicating testis;</p> <p>(iv) label <b>U</b> clearly indicating urethra;</p> <p><b>(b)</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</p> <p><b>(c)</b> <u>meiosis</u>;</p> <p>four;  haploid;  half;</p> <p style="text-align: right;"><b>[Total: 10]</b></p>	<p>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</p> <p>[1] R – line to epididymis</p> <p>[1] A – any point on the duct as shown in Fig. 8.1 prior to junction in prostate gland</p> <p>[1] R – line to epididymis</p> <p>[1]</p> <p>MP2&amp;3 R – hair unqualified  MP2&amp;3 No credit for ref. to hair on scalp  MP4 I – change of voice  A – broader shoulders</p> <p>MP8 I – enlargement (could be ref to erection)</p> <p>Only accept terms from the list</p> <p>[4] I – “N / n”</p>
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9	<p><b>(a) (i)</b> nitrates / ammonium / magnesium / phosphates / potassium; <b>Any two – total 1 mark</b></p>	[1]	I – nitrogen / ammonia / phosphorus A – correct ionic chemical symbols
	<p><b>(ii)</b> 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</p>	[4]	must be in correct context
	<p><b>(iii)</b> 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</p>	[3]	I – refs to insects / other animals / pests I – ref to improved crop yield  I – ref to food / nutrients
	<p><b>(iv)</b> 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</p>	[2]	
	<p><b>(b)</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;</p>	[2]	
	<b>[Total:12]</b>		