

MARK SCHEME for the May/June 2011 question paper
for the guidance of teachers

0610 BIOLOGY

0610/21

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.

mitosis underlined words – this word only

1	cat	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	cat family member	<p>note – no mark for cat A</p> <p>I – all ticks and crosses in the grid</p> <p>A – if generic name letter missing credit species name alone</p> <p>R – if wrong generic name letter given</p> <p>I – common names such as lion, tiger etc.</p>
	A											<i>L. caracal</i>	
	B											<i>A. jubatus;</i>	
	C											<i>P. leo;</i>	
	D											<i>N. nebulosa;</i>	
	E											<i>L. rufus;</i>	
	F											<i>P. tigris;</i>	
each correctly identified cat – 1 mark												[5]	
												[Total: 5]	

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<p>2 (a) (i) 1 a diet that contains all the necessary nutrients / OWTTE; 2 in the required quantities / OWTTE; 3 for sex / age / activity; 4 to maintain health / for healthy living;</p> <p>any three – 1 mark each [3]</p> <p>(ii) two of – carbohydrates / protein / water; [1]</p> <p>(b) <u>too little fibre</u> – 1 fibre aids peristalsis / aid movement through alimentary canal / OWTTE; 2 can lead to constipation; 3 associated with (colon) cancer;</p> <p>any two – 1 mark each [2]</p> <p><u>too much fat</u> – 1 body stores (excess) fat; 2 can lead to obesity / overweight; 3 associated with coronary heart disease; 4 increase risk of diabetes</p> <p>any two – 1 mark each [2]</p> <p>(c) 1 calcium used in bones / teeth; 2 strengthens / hardens bone / teeth / enamel; 3 lack leads to rickets (in bones); 4 bones lack rigidity / become bent / curved; 5 teeth more prone to disease / decay / cavities; 6 involved in clotting / OWTTE; 7 blood may not clot properly;</p> <p>any three – 1 mark each [3]</p> <p style="text-align: right;">[Total: 11]</p>	<p>A – ref. to 7 nutrients, list of all 7 necessary nutrients A – amount, not in excess</p> <p>note – two responses for 1 mark. A – starch / sugar as alternatives for carbohydrate</p> <p>I – ref. to diarrhoea</p> <p>A – other descriptions of overweight A – specific correct ref. to symptoms e.g. heart attack, block arteries I – heart problems as too vague</p>
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<p>3 (a) M – <u>urethra</u>; N – sperm duct / vas deferens; O – <u>ureter</u>;</p> <p><u>testes</u> – produce sperm / male gametes / sex cells; produce / release testosterone;</p> <p><u>prostate gland</u> – produces (part of) seminal fluid / semen / fluid that activates / nourishes sperm / fluid for sperm to swim in;</p> <p><u>scrotum</u> – supports / holds / contains testes (outside of body cavity) / allows testes to stay below body temperature / cool;</p> <p>(b) (i) X must be clearly linked to sperm duct;</p> <p>(ii) condom; latex / rubber is impermeable (to body fluids / semen); prevents female body fluids coming in contact with male tissue / male body fluids coming in contact with female tissue;</p> <p>(iii) HIV / syphilis / gonorrhoea / (genital) herpes / NSU chlamydia;</p> <p style="text-align: right;">[Total: 11]</p>	<p>[3]</p> <p>[2]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[2]</p> <p>[1]</p>	<p>I – stores sperm A – male hormone</p> <p>R – X on urethra; If more than 1 X on Fig, if any wrong – no mark</p> <p>A – ref. to causative agent in lieu of body fluid A – prevents contact / exchange of body fluids; I – ref. to contraception</p> <p>A – AIDS and any other valid example</p>
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<p>4 (a) (i) A – sensory neurone; B – motor neurone; C – synapse; D – relay neurone;</p> <p>(ii) muscles; glands;</p> <p>(b) (i) response (to a stimulus) that is automatic / involuntary / OWTTE; and rapid;</p> <p>(ii) withdrawal reflex / knee jerk reflex / iris reflex;</p> <p style="text-align: right;">[Total: 9]</p>	<p>[4] A – intermediate, internuncial, connector neurone</p> <p>[2] I – specific examples</p> <p>[2] A – ref. to a correct sequence of neurones MAX 1</p> <p>[1] A – descriptions of a reflex A – any other valid reflex action</p>	<p>A – nerve fibre, nerve</p>
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5 (a) (i) ovary / testis; [1]

I – gonads, sex organs, gametes

(ii) ovary / anther; [1]

I – gametes, ovum
A – ovule / stamen / carpel

MP	differences	
	mitosis	meiosis
1	chromosome number stays the same / produces diploid nuclei	halves chromosome number / produces haploid nuclei;
2	forms body cells	forms gametes;
3	cells have paired chromosomes	cells have unpaired chromosomes;
4	no exchange of genetic material	can have exchange of genetic material;
5	forms two nuclei	forms four nuclei;
6	new nuclei genetically identical to original / one another	new nuclei genetically different to original / one another
7	comprises one division	comprises two divisions;

A – cells for nuclei

A – any other valid point

A – cells for nuclei

A – cells for nuclei

any three – 1 mark each [3]

(b) (i) change in gene / DNA;
change in the structure / number of chromosomes; [2]

I – genetic material

(ii) 1 X rays;
2 ultra violet light;
3 ionising radiation;

I – pollution, smoking,

4 (mutagenic) chemicals;

A – alpha, beta, gamma rays, radioactivity, nuclear fallout
I – radiation

any two – 1 mark each [2]

A – any named mutagen, cigarette tar

[Total: 9]

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6 (a) (i) photosynthesis;	[1]	
(ii) chlorophyll;		I – chloroplasts
(iii) 12 000 kJ;		
(iv) bacteria; fungi;	[2]	
(v) 8000 / 100 000 × 100; 8 (%);	[2]	note – if correct answer given but no working then award both marks
(vi) 1 energy released / lost by respiration; 2 used in metabolism / chemical reactions; 3 used in body activities / movement / passage of impulses; 4 lost as heat (to the environment); 5 lost in excreta; 6 lost in decomposition at death; 7 not all of primary consumer is eaten;		R – energy used in or for respiration e.g. digestion
any three – 1 mark each	[3]	
(b) group of organisms of one species; living in same area and at the same time;	[2]	
	[Total: 12]	

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<p>7 (a) (i) D – next to relevant arrow;</p> <p>(ii) P – next to relevant arrow;</p> <p>(iii) R – next to relevant arrow;</p> <p>(b)</p> <p>1 use of fossil fuels;</p> <p>2 because of increased energy demands;</p> <p>3 use of vehicles;</p> <p>4 less photosynthesis;</p> <p>5 because of deforestation / OWTTE;</p> <p>6 burning of trees / forests;</p> <p>any four – 1 mark each</p>	<p>[1]</p> <p>[4]</p> <p>[Total: 7]</p>	<p>note – for any letter if it is written more than once on Fig. only award mark if all are correct</p> <p>Responses must be in context of increasing activities since 1850 to gain credit</p> <p>A – refs to industry, factories</p> <p>A – less carbon dioxide being used up</p> <p>A – decreased numbers of trees</p> <p>A – increased population (more respiration)</p> <p>A – any other valid point e.g. detail / explanation of one of the MPs</p>
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<p>8 (a) (i) aorta and pulmonary vein(s);</p> <p>(ii) P;</p> <p>(iii) Q / R;</p> <p>(b) 1 contraction of muscles / wall; 2 of <u>left</u> ventricle; 3 increases pressure; 4 forces cuspid / bicuspid / S valve shut; 5 forces semi lunar / R valve open;</p> <p>any three – 1 mark each</p> <p>(c) (i) coronary artery / vessels;</p> <p>(ii) hepatic artery; hepatic portal vein;</p>	<p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[3]</p> <p>[2]</p> <p>[Total: 9]</p>	<p>note – two responses for 1 mark</p> <p>A – Q and R</p> <p>I – ref. to P I – ref. to Q</p> <p>A – in either order</p>
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<p>9 (a)</p> <ol style="list-style-type: none"> 1 evaporation of water from leaf / stem / plant; 2 diffusion of water vapour; 3 through stomata; 4 down concentration gradient; <p>any three – 1 mark each</p> <p style="text-align: right;">[3]</p> <p>(b)</p> <ol style="list-style-type: none"> 1 temperature rise increases the rate of transpiration / evaporation / ORA; 2 warm air can contain more water (vapour) / ORA; 3 increases concentration gradient / ORA; <ol style="list-style-type: none"> 1 increasing light increases the rate of transpiration / ORA; 2 increasing light stomata open further / ORA; 3 allows more diffusion / ORA; <ol style="list-style-type: none"> 1 decreasing humidity increases the rate of transpiration / evaporation / ORA; 2 drier air increases concentration gradient / ORA; 3 more water vapour lost / ORA; <ol style="list-style-type: none"> 1 increasing wind speed increases the rate of transpiration / ORA; 2 more air movement removes saturated air / ORA; 3 away from stomata / (leaf) surface; <p>any two factors – 2 marks max each</p> <p style="text-align: right;">[4]</p> <p style="text-align: right;">[Total: 7]</p>	<p>No credit for effects of transpiration</p> <p>I – ref. to mineral salts</p> <p>A – from high concentration to lower concentration (of water), down water potential gradient</p> <p>Read response as two separate paragraphs. Responses may include factor in description. No credit for naming factor.</p> <p>I – ref. to time of day</p>
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