

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

0610/21

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

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1													<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>
cat	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	cat family member		
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>[3]</p> <p>[2]</p> <p>[1]</p> <p>[1]</p>	
<p>(b) (i) X must be clearly linked to sperm duct;</p> <p>(ii) condom;</p> <p>latex / rubber is impermeable (to body fluids / semen);</p> <p>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>[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>
[Total: 11]		

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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>A – nerve fibre, nerve</p> <p>[4] A – intermediate, internuncial, connector neurone</p> <p>[2] A – in either order 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>
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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																																	
	<table border="1"> <thead> <tr> <th>MP</th> <th>differences</th> <th></th> </tr> <tr> <th></th> <th>mitosis</th> <th>meiosis</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>chromosome number stays the same / produces diploid nuclei</td> <td>halves chromosome number / produces haploid nuclei;</td> <td>A – cells for nuclei</td> </tr> <tr> <td>2</td> <td>forms body cells</td> <td>forms gametes;</td> <td>A – any other valid point</td> </tr> <tr> <td>3</td> <td>cells have paired chromosomes</td> <td>cells have unpaired chromosomes;</td> <td></td> </tr> <tr> <td>4</td> <td>no exchange of genetic material</td> <td>can have exchange of genetic material;</td> <td></td> </tr> <tr> <td>5</td> <td>forms two nuclei</td> <td>forms four nuclei;</td> <td>A – cells for nuclei</td> </tr> <tr> <td>6</td> <td>new nuclei genetically identical to original / one another</td> <td>new nuclei genetically different to original / one another</td> <td>A – cells for nuclei</td> </tr> <tr> <td>7</td> <td>comprises one division</td> <td>comprises two divisions;</td> <td></td> </tr> </tbody> </table>	MP	differences			mitosis	meiosis	1	chromosome number stays the same / produces diploid nuclei	halves chromosome number / produces haploid nuclei;	A – cells for nuclei	2	forms body cells	forms gametes;	A – any other valid point	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;	A – cells for nuclei	6	new nuclei genetically identical to original / one another	new nuclei genetically different to original / one another	A – cells for nuclei	7	comprises one division	comprises two divisions;		
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	(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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<p>6 (a) (i) photosynthesis;</p> <p>(ii) chlorophyll;</p> <p>(iii) 12 000 kJ;</p> <p>(iv) bacteria; fungi;</p> <p>(v) 8000 / 100 000 × 100; 8 (%);</p> <p>(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;</p> <p>any three – 1 mark each</p> <p>(b) group of organisms of one species; living in same area and at the same time;</p>	<p>[1]</p> <p>[2]</p> <p>[2]</p> <p>[3]</p> <p>[2]</p> <p>[Total: 12]</p>	<p>I – chloroplasts</p> <p>note – if correct answer given but no working then award both marks</p> <p>R – energy used in or for respiration</p> <p>e.g. digestion</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 style="text-align: right;">[Total: 9]</p>	<p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[3]</p> <p>[2]</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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