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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International Examinations

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

1

cat	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	cat family member
A											*L. caracal*
B											*A. jubatus;*
C											*P. leo;*
D											*N. nebulosa;*
E											*L. rufus;*
F											*P. tigris;*

each correctly identified cat – 1 mark [5]

[Total: 5]

note – no mark for cat A

I – all ticks and crosses in the grid

A – if generic name letter missing credit species name alone
R – if wrong generic name letter given
I – common names such as lion, tiger etc.

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; any three – 1 mark each [3]	A – ref. to 7 nutrients, list of all 7 necessary nutrients A – amount, not in excess	
(ii) two of – carbohydrates / protein / water; [1]	**note** – two responses for 1 mark. A – starch / sugar as alternatives for carbohydrate	
(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; any two – 1 mark each [2]	I – ref. to diarrhoea	
<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 any two – 1 mark each [2]	A – other descriptions of overweight A – specific correct ref. to symptoms e.g. heart attack, block arteries I – heart problems as too vague	
(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; any three – 1 mark each [3]		
[Total: 11]		

3 (a)	**M** – urethra; **N** – sperm duct / vas deferens; **O** – ureter; [3]	
	testes – produce sperm / male gametes / sex cells; produce / release testosterone; [2]	I – stores sperm A – male hormone
	prostate gland – produces (part of) seminal fluid / semen / fluid that activates / nourishes sperm / fluid for sperm to swim in; [1]	
	scrotum – supports / holds / contains testes (outside of body cavity) / allows testes to stay below body temperature / cool; [1]	
(b) (i)	**X** must be clearly linked to sperm duct; [1]	R – X on urethra; If more than 1 X on Fig, if any wrong – no mark
(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; [2]	A – ref. to causative agent in lieu of body fluid A – prevents contact / exchange of body fluids; I – ref. to contraception
(iii)	HIV / syphilis / gonorrhoea / (genital) herpes / NSU chlamydia; [1]	A – AIDS and any other valid example
	[Total: 11]	

4	(a) (i)	**A** – sensory neurone; **B** – motor neurone; **C** – synapse; **D** – relay neurone; [4]	A – nerve fibre, nerve A – intermediate, internuncial, connector neurone
	(ii)	muscles; glands; [2]	A – in either order I – specific examples
	(b) (i)	response (to a stimulus) that is automatic / involuntary / OWTTE; and rapid; [2]	A – ref. to a correct sequence of neurones **MAX 1**
	(ii)	withdrawal reflex / knee jerk reflex / iris reflex; [1]	A – descriptions of a reflex A – any other valid reflex action
		[Total: 9]	

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]

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; any three – 1 mark each [3]	R – energy used in or for respiration e.g. digestion
(b)	group of organisms of one species; living in same area and at the same time; [2]	
	[Total: 12]	

7 **(a)** **(i)** **D** – next to relevant arrow; [1] **(ii)** **P** – next to relevant arrow; **(iii)** **R** – next to relevant arrow; **(b)** 1 use of fossil fuels; 2 because of increased energy demands; 3 use of vehicles; 4 less photosynthesis; 5 because of deforestation / OWTTE; 6 burning of trees / forests; any four – 1 mark each [4] **[Total: 7]**	**note** – for any letter if it is written more than once on Fig. only award mark if all are correct Responses must be in context of increasing activities since 1850 to gain credit A – refs to industry, factories A – less carbon dioxide being used up A – decreased numbers of trees A – increased population (more respiration) A – any other valid point e.g. detail / explanation of one of the MPs

8	**(a)**	**(i)**	aorta and pulmonary vein(s); [1]	**note** – two responses for 1 mark
		(ii)	**P**; [1]	
		(iii)	**Q** / **R**; [1]	A – Q and R
	(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; any three – 1 mark each [3]	I – ref. to P I – ref. to Q
	(c)	**(i)**	coronary artery / vessels;	
		(ii)	hepatic artery; hepatic portal vein; [2]	A – in either order
			[Total: 9]	

9	**(a)**	1 evaporation of water from leaf / stem / plant; 2 diffusion of water vapour; 3 through stomata; 4 down concentration gradient; any three – 1 mark each [3]	No credit for effects of transpiration I – ref. to mineral salts A – from high concentration to lower concentration (of water), down water potential gradient
	(b)	1 temperature rise increases the rate of transpiration / evaporation / ORA; 2 warm air can contain more water (vapour) / ORA; 3 increases concentration gradient / ORA; 1 increasing light increases the rate of transpiration / ORA; 2 increasing light stomata open further / ORA; 3 allows more diffusion / ORA; 1 decreasing humidity increases the rate of transpiration / evaporation / ORA; 2 drier air increases concentration gradient / ORA; 3 more water vapour lost / ORA; 1 increasing wind speed increases the rate of transpiration / ORA; 2 more air movement removes saturated air / ORA; 3 away from stomata / (leaf) surface; any two factors – 2 marks max each [4] **[Total: 7]**	Read response as two separate paragraphs. Responses may include factor in description. No credit for naming factor. I – ref. to time of day