**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.

| Page 2 | Mark Scheme: Teachers' version | Syllabus | Paper |
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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.

<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.

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| | | |
|---|---|---|
| **2** **(a)** **(i)** 1 a diet that contains all the necessary nutrients / OWTTE;<br>2 in the required quantities / OWTTE;<br>3 for sex / age / activity;<br>4 to maintain health / for healthy living;<br><br>any three – 1 mark each [3] | A – ref. to 7 nutrients, list of all 7 necessary nutrients<br>A – amount, not in excess | |
| **(ii)** two of – carbohydrates / protein / water; [1] | **note** – two responses for 1 mark.<br>A – starch / sugar as alternatives for carbohydrate | |
| **(b)** <u>too little fibre</u> –<br>1 fibre aids peristalsis / aid movement through alimentary canal / OWTTE;<br>2 can lead to constipation;<br>3 associated with (colon) cancer;<br><br>any two – 1 mark each [2] | I – ref. to diarrhoea | |
| <u>too much fat</u> –<br>1 body stores (excess) fat;<br>2 can lead to obesity / overweight;<br>3 associated with coronary heart disease;<br>4 increase risk of diabetes<br><br>any two – 1 mark each [2] | A – other descriptions of overweight<br>A – specific correct ref. to symptoms e.g. heart attack, block arteries<br>I – heart problems as too vague | |
| **(c)** 1 calcium used in bones / teeth;<br>2 strengthens / hardens bone / teeth / enamel;<br>3 lack leads to rickets (in bones);<br>4 bones lack rigidity / become bent / curved;<br>5 teeth more prone to disease / decay / cavities;<br>6 involved in clotting / OWTTE;<br>7 blood may not clot properly;<br><br>any three – 1 mark each [3] | | |
| **[Total: 11]** | | |

| | | |
|---|---|---|
| 3 (a) | **M** – <u>urethra</u>;<br>**N** – sperm duct / vas deferens;<br>**O** – <u>ureter</u>; [3] | |
| | <u>testes</u> –<br>produce sperm / male gametes / sex cells;<br>produce / release testosterone; [2] | I – stores sperm<br>A – male hormone |
| | <u>prostate gland</u> –<br>produces (part of) seminal fluid / semen / fluid that<br>activates / nourishes sperm / fluid for sperm to swim in; [1] | |
| | <u>scrotum</u> –<br>supports / holds / contains testes (outside of body cavity) /<br>allows testes to stay below body temperature / cool; [1] | |
| (b) (i) | **X** must be clearly linked to sperm duct; [1] | R – X on urethra;<br>If more than 1 X on Fig, if any wrong – no mark |
| (ii) | condom;<br><br>latex / rubber is impermeable (to body fluids / semen);<br><br>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<br>A – prevents contact / exchange of body fluids;<br>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;<br>**B** – motor neurone;<br>**C** – synapse;<br>**D** – relay neurone; [4] | A – nerve fibre, nerve<br><br><br>A – intermediate, internuncial, connector neurone |
| | **(ii)** | muscles;<br>glands; [2] | A – in either order<br>I – specific examples |
| | **(b)** **(i)** | response (to a stimulus) that is automatic / involuntary / OWTTE;<br>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<br>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;<br>fungi; [2] | |
| **(v)** 8000 / 100 000 × 100;<br>8 (%); [2] | **note** – if correct answer given but no working then award both marks |
| **(vi)** 1 energy released / lost by respiration;<br>2 used in metabolism / chemical reactions;<br>3 used in body activities / movement / passage of impulses;<br>4 lost as heat (to the environment);<br>5 lost in excreta;<br>6 lost in decomposition at death;<br>7 not all of primary consumer is eaten;<br><br>any three – 1 mark each [3] | R – energy used in or for respiration<br><br>e.g. digestion |
| **(b)** group of organisms of one species;<br>living in same area and at the same time; [2] | |
| **[Total: 12]** | |

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

| | | | |
|---|---|---|---|
| 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;<br>2 of <u>left</u> ventricle;<br>3 increases pressure;<br>4 forces cuspid / bicuspid / S valve shut;<br>5 forces semi lunar / R valve open;<br>any three – 1 mark each [3] | | I – ref. to P<br>I – ref. to Q |
| | **(c) (i)** coronary artery / vessels; | | |
| | **(ii)** hepatic artery;<br>hepatic portal vein; [2] | | A – in either order |
| | **[Total: 9]** | | |

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