UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the November 2004 question paper

0610 BIOLOGY

0610/02 **Paper 2 (Core Theory), maximum mark 80**

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

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

CIE is publishing the mark schemes for the November 2004 question papers for most IGCSE and GCE Advanced Level syllabuses.

Grade thresholds taken for Syllabus 0610/02 (Biology) in the November 2004 examination.

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 2	80	N/A	46	35	30

The threshold (minimum mark) for B is set halfway between those for Grades A and C.
The threshold (minimum mark) for D is set halfway between those for Grades C and E.
The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.
Grade A* does not exist at the level of an individual component.

NOVEMBER 2004

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0610/02

BIOLOGY
Paper 2 (Core Theory)

UNIVERSITY of CAMBRIDGE
International Examinations

1 **A** - fish;

B - reptiles;

C - birds;

D - mammals;

E - amphibians;

accept scientific names - e.g. Mammalian, Aves etc.

more than one name in box = 0

ignore references to examples

any four - 1 mark each **[4]**

Total [4]

2 **(a)** mitosis produces 2 cells/nuclei - meiosis produces 4 cells/nuclei;

mitosis produces body cells - meiosis produces gametes;

mitosis produces diploid cell/nuclei - meiosis produces haploid cells/nuclei;

accept references to full set/half set chromosomes or 2N/N

mitosis produces (genetically) identical cells/nuclei - meiosis produces (genetically) different cells/nuclei;

Any two - 1 mark each **[2]**

(b) **(i)** an alteration in a gene/chromosome/DNA/increase/decrease in chromosome number; **[1]**

(ii) chemicals/named example;

radiation/1st named example;

2nd named example of radiation;

Any two - 1 mark each **[2]**

(iii) Down's syndrome (mongolism)/other valid examples; **[1]**

Total [6]

3 (a) **A** - ureter;

B - urethra; **[2]**

(b) (i) **S** - label indicating prostate gland/seminal vesicle;

(ii) **G** - label indicating testis; **R** - epididymis

(iii) **T** - label indicating testis; **R** - epididymis **[3]**

(c) enlargement of shoulder girdle/limb bones;

development of (skeletal) muscles;

(growth of) pubic/axillary hair;

(growth of) body hair (qualified)/facial hair;

breaking of voice/alteration of larynx/voice box;

growth of penis/testes;

any three - 1 mark each **[3]**

(d) label indicating sperm duct;

accept any region between epididymis and prostate **[1]**

(e) (i) wearing/using a condom/sheath/femidom; **R** - contraceptive **[1]**

(ii) infected/sharing needles/other blades (e.g. razors);

across placenta/via mammary glands/milk;

tattooing/body piercing;

transfer of blood (via cuts etc.);

blood transfusions;

Any two - 1 mark each **[2]**

(f) in males carries semen/sperm but not in females; **[1]**

Total [13]

4 **(a)** carbon dioxide + water/(6)CO_2 + (6)H_2O;

sugar/glucose/carbohydrate + oxygen/$C_6H_{12}O_6$ + (6)O_2;

I - references to light and chlorophyll **[2]**

(b) **(i)** chloroplast; **[1]**

(ii) light/sunlight; **R** - solar energy

chemical; **[2]**

(c) starch;

cellulose; **[2]**

(d) in solution;

named example/sucrose/amino acids;

in phloem;

by translocation;

Any three - 1 mark each **[3]**

(e) **(i)** reduced/no photosynthesis/less/no carbon dioxide removed by photosynthesis;

decreased/no decay/less/no carbon dioxide released by decay;

increased combustion/more carbon dioxide/soot/carbon released by combustion;

Any two - 1 mark each **[2]**

(ii) lead to reduced humus content;

increased leaching/mineral loss;

chemical/pH change to soil/laterite formation;

(increased) erosion;

(increased) run off;

desertification;

Any two - 1 mark each **[2]**

Total [14]

5 **(a)** **(i)** **A** - pupil;

B - iris; **[2]**

(ii) iris same outer size with larger pupil; **[1]**

(b) (i) shown and labelled

receptor;

sensory neurone (in dorsal root);

spinal cord;

grey/white matter;

relay neurone (in grey matter of spinal cord);

motor neurone (in ventral root);

effector;

synapse (between two neurones - even if neurones mispositioned);

Any five - 1 mark each **[5]**

(ii) retina; **[1]**

(c) (i) 3; **[1]**

(ii) 4; **[1]**

Total [11]

6 (a) (i) producer/**A**/green plant; **[1]**

(ii) base level/trophic level 1/producer level much smaller in pyramid of numbers;

suggests a small number of very large producers/trees etc; **[2]**

(iii) **D** needs a constant supply of **C** for food/OWTTE;

there must be sufficient of **C** (as food and) as a breeding group/OWTTE;

individuals of **D** larger than **C** thus requires more than 1 : 1 ratio;

loss of energy from trophic level **C** to trophic level **D**;

Any two - 1 mark each **[2]**

(b) limitations of/competition for food supply;

predation;

disease/parasites;

competition for space/habitats;

Any three - 1 mark each **[3]**

(c) (i) producer/**A;** **[1]**

(ii) tertiary consumer/**D**; **[1]**

(iii) harmful effect/toxicity on tertiary consumer;

reduce fertility/cause sterility;

killing useful insects;

e.g. pollinators/detritivores/predators of pests;

Any two - 1 mark each **[2]**

Total [12]

7 (a) glucose metabolism

converts glucose;

into glycogen;

triggered/stimulated by insulin;

and stores it;

(alternatively accept account for action in response to glucagon)

fat digestion

makes bile/bile salts;

emulsifies fats/description/increases surface area;

for enzyme/lipase action;

Any five - 1 mark each **[5]**

(b) (i) (excess) amino acids/ammonia/ammonium; **[1]**

(ii)

	blood in capillaries of kidney	liquid filtered from blood before reabsorption	urine
glucose		✓	
minerals		✓	✓
urea		✓	✓
water		✓;	✓;

accept blank space or any symbol or word that indicates no glucose in urine
each column correctly ticked - 1 mark **[2]**

Total [8]

8 (a) movement of molecules/particles/ions;

from a high concentration to a low concentration/down a concentration gradient;

R - along concentration gradient **[2]**

(b) (i) points plotted accurately;

points joined;

curve labelled/key; **[3]**

(ii) because of ammonium hydroxide/ammonia (has reached it)/is alkaline/
pH changed; **[1]**

(iii) (sample) **A;** **[1]**

(iv) its concentration is higher than **A**/lower than **B**/between **A** and **B;**

as its rate of diffusion is faster/slower/intermediate to **A** and **B;** **[2]**

(c) (i) (point) **Z;** **[1]**

(ii) mucus traps bacteria/dust;

cilia push mucus towards trachea/throat/away from lungs; **[2]**

Total [12]