UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2006 question paper

0610 BIOLOGY

0610/03 Paper 3, maximum raw mark 80

These mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. They show the basis on which Examiners were initially instructed to award marks. They do 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*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

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1 **(a)** ciliated tissue – moves dust and bacteria up the bronchi ;
root hair tissue – absorbs water and minerals from soil ;
xylem tissue – transports water and minerals through the stem ;
muscle tissue – contracts to cause movement ; **[4]**

(b) a leaf contains different types of cells / a tissue only contains one type ;
at least two named examples of tissues in a leaf ;
leaf/organ + carries out a number of functions (or vice versa for tissue) ; **[3]**

[Total: 7]

2 **(a)** annelids are segmented ; (or v.v) Ⓐ ref. to rings
annelids have identifiable / terminal + mouth / anus ; (or v.v)
annelids can have clitellum ; (or v.v)
annelids (may) have + chaetae / bristles ; (or v.v) **[max. 2]**

(b) **(animal feature)**
ref. to secretion of enzymes / heterotrophic nutrition ;
Ⓐ inability to photosynthesise
ref. to production of glycogen ;
ref. to presence of chitin ; **[max. 1]**

(plant feature)
presence of cell wall ;
presence of vacuole ; **[max. 1]**

(c) **(i)** diagram recognisable + reasonable size ;
MARK TWO FEATURES DRAWN AND LABELLED FROM:
RNA / DNA strand ;
protein coat / capsid ;
envelope ;
capsomere ; **[max. 3]**

(ii) ref. to invasion of <u>lymphocytes</u> ;
so no production of antibodies ; (linked to first point)
ref. to decrease in body's ability to fight infection ; **[3]**

[max.10]

3 **(a)** (voluntary)
ref. to going into room ;
ref. to switching on light ;
ref. to grabbing door handle ;

(involuntary)
pupils changed size ;
heart beat speeded up ;
ref. to sneezing ; **[max. 4]**

(b) **(i)** muscle ;
gland ; **[2]**

(ii) motor / efferent (neurone) ; **[1]**

(c) **(i)** phototropism ; (ignore refs. to positive or negative) **[1]**

(ii) paint auxin on one side of shoot (or description of other suitable treatment) ;
place shoot in a dark place AW ;
leave + for stated period of time (e.g. 1 to 3 days) / until the shoot
to grows vertically / changes direction AW ;
ref. to control without auxin ;
ref. to repeats used ; **[max. 4]**

(iii) auxin accumulates on or moves to + shaded side of shoot / auxin is broken down by light ;
difference in concentrations on shaded side and light side ;
cells with higher concentration of auxin absorb more water ;
causes unequal growth ; **[max. 3]**

(d) i. ref. to large concentrations used ;
ii. plants / leaves / stems + are stimulated to grow rapidly ;
iii. growth gets out of control ;
iv. root growth inhibited by high concentrations of auxin ;
v. so plants die ; (linked to ii, iii or iv) ;
vi. ref. to only broad leaved plants affected AW ; **[max. 2]**

[max. 17]

4 **(a)** a chemical messenger AW;
secreted by an endocrine gland ;
ref. to transport in blood ;
ref. to affecting a target organ ; **[max. 2]**

(b) ref. to blood sugar level being high ;
(insulin) secreted by pancreas ;
passes in blood stream + to liver ;
stimulates liver to absorb glucose ;
converts glucose to glycogen ;
ref. to increased respiration by liver to reduce blood sugar levels ; **[max. 4]**

(c) ref. to being digested / broken down ;
by protease / pepsin ; **[2]**

(d) **(i)** CORRECT ORDER AND NAMES NEEDED FOR THREE MARKS
TWO MARKS FOR CORRCT NAMES IN WRONG ORDER
ONE MARK FOR TWO CORRECT NAMES

trachea / windpipe → ronchus → bronchiole **[3]**

(ii) diffusion ;
active uptake / active transport ; **[max. 1]**

(iii) thin walls / walls one cell thick ; ® refs. to cell walls
large surface area ;
large numbers of alveoli ;
closely associated with + capillaries / blood stream ;
moist lining ;
ref. to presence of mitochondria ; **[max. 3]**

[max. 15]

5 **(a)** **(i)** maintaining cell turgidity ;
preventing wilting ;
transport of named materials (minerals / amino acids / sugars) ;
medium for enzyme action ;
raw material for photosynthesis ; **[max. 3]**

(ii) salt concentration in soil is higher than in roots AW ;
ref. to water potential is greater in root cells than in soil / w.p gradient goes from cells to soil AW;
so water is drawn out of roots + by osmosis ;
cells become flaccid ;
plant wilts ;
plant lacks water ; **[max. 3]**

(b) **(i)** active transport ; **[1]**

(ii) growth would be slower ;
because some of the plant's energy would be used in active transport ; **[2]**

(iii) (ACCEPT OTHER NUTRIENTS AND FUNCTIONS)
magnesium ;
ref. to the formation of chlorophyll ;
nitrate ;
ref. to growth / formation of amino acids or protein ; **[4]**

(c) the removal of a gene from one species ;
and its insertion into another species ;
(in article) genes are modified, not transferred AW ;
Ⓐ other valid arguments **[3]**

(d) ref. to leaching of minerals AW ;
ref. to eutrophication + of rivers / lakes ;
ref. to soil erosion ;
creation of water shortage ;
ref. to soil + becomes infertile / lacks minerals ; **[max. 2]**

[max. 18]

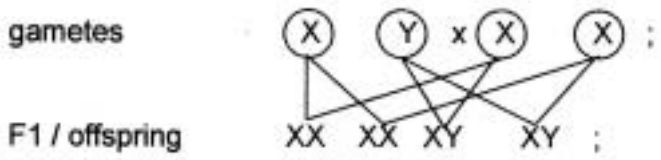
6 (a) (MAX. 2 IN EACH SECTION)
(developing country)
largest % is at 0-5 years old ;
% decreases as age increases ;
smallest % over 65 years old ;
(developed country)
small percentage of under 15s ;
only small variation in % as age increases AW ;
relatively high % survives beyond 65 years old ;
largest group is 40 - 45 years old ; **[max. 3]**

(b) (i) the developing country has a larger % ;
the % decreases in the developing country / % shows little change with age in the developed country / less infant mortality in developed country ; **[max. 1]**

(ii) more over 65s in developed country ;
max. age is 80 in developing country + 90 in developed country ; **[max. 1]**

(c) (both have) more females than males ; **[1]**

(d) male / father = XY + female / mother = XX ;



So, ratio = 1 : 1 ; **[4]**

(e) (i) BOTH ANSWERS MUST BE CORRECT FOR THE MARK

	average life expectancy
developing country	54
developed country	74;

[1]

(ii) ref. to better health care or medical facilities + in developed countries ; (or v.v)
ref. to more disease in developing countries ; (or v.v)
ref. to better diet in developed countries AW ; (or v.v)
ref. less food available in developing countries ; (or v.v)
ref. to more wars in developing countries ; (or v.v) **[max. 2]**

[max. 13]