UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2007 question paper

0610 BIOLOGY

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

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

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.

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1 (a) (i) leaf **B** – has parallel veins/veins not branched;

(ii) organism **D** – has body divided into segments/rings/OWTTE;

(iii) organism **E** – has four pairs of/eight legs/limbs ;
I - ref to cephalothorax (erroneous) [1]

(iv) organism **G** – has more than 4 pairs of legs/limbs/non-identical/varied

legs/limbs/2 regions to body/cephalothorax and abdomen;
I – refs to exoskeleton [1]

N.B. No letter given – no mark

(b) show division of 50/5;

(magnification) x10/times 10; R – 10mm
If no working then 2 marks for correct magnification
If wrong working can gain 1 mark for correct magnification
I – ratios [2]

[Total: 6]

2 (a) **A** = sepal/calyx;

B = anther/stamen; Accept – androecium [2]

(b) to receive/trap pollen/OWTTE; Accept – ref to male gamete [1]

(c) 1 no nectary (in wind pollinated flower);

2 smaller/less obvious petals (in wind pollinated flower);

3 stamens outside of petals/flowers (in wind pollinated flower);

4 stigma/style outside of petals/flowers (in wind pollinated flower);

5 feathery stigma (in wind pollinated flower);

any two – 1 mark each [2]

(d)	process	flowering plant	human
	fertilisation	√	√
	germination	√	
	implantation		√
	pollination	√	
	sexual intercourse		√

Each vertical column correct – 1 mark each [2]
I – crosses in other boxes

(e) (i) 1 dispersed by animals/mammals/birds/named examples; R – insects

2 red outer coat attracts them;

3 flesh encourages them to eat fruit;

4 seeds hard coats allow it to avoid digestion/discourage swallowing;

5 dispersal in faeces/dropped while removing flesh;

any three – 1 mark each [3]

(ii) 1 moisture/water/OWTTE;

2 with minerals/named mineral;

3 warm conditions/suitable/optimum temperature;

4 in light/not shaded area;

any three – 1 mark each [3]

[Total: 13]

3 (a) continuous (variation); [1]

(b) (i) plotted as four bars, all clearly identified (beneath or on bar);

accurate plotting (+/– half a square); [2]

(ii) genes/alleles/genotype/DNA/OWTTE; [1]

(c) (i) a change/alteration in a gene/allele/DNA/chromosome/chromosome number; [1]

(ii) chemical/named example/cigarette tar;

(gamma/beta/alpha/ionising) radiation;

X rays;

UV light;

any two – 1 mark each [2]

[Total: 7]

4 **(a)** **(i)** F;

(ii) E;

(iii) no tropical forest left/all destroyed; [1]

(iv) D; [1]

(b) **(i)** bacteria/fungi; [1]

(ii) carbon dioxide;

minerals/named mineral salt/ion; I – nutrients R – nitrogen (gas) [2]

(c) 1 crops take/use mineral salts from soil;

2 crop removed from land;

3 soil becomes infertile/low in mineral salts;

4 crop yield drops to worthless levels;

5 no fresh/replacement of humus/no recycling of materials;

6 crumb structure lost;

any three – 1 mark each [3]

[Total: 10]

5 **(a)** **(i)** carbon compounds in animals; [1]

(ii) **C**;

D;

E;

any two 1 mark each [2]

(iii) **B**; [1]

(iv) **A**; [1]

(b) **(i)** arrow labelled **P** parallel to **C** but in opposite direction/
linking boxes from air to plants around outside of diagram; [1]

(ii) carbon dioxide + water;

= glucose/(simple) sugar/starch + oxygen; [2]

I – ref to water on product side
A – correct formula as substitute for word
no need for equation to be balanced

[Total: 8]

6 **(a)** **A**;

D;

E; [3]

I – named parts

(b) root hair cell –

1 long extension/description to cell;

2 increase surface area (for absorption);

3 no chloroplasts/chlorophyll;

4 underground/hidden from light; [4]

I - ref to photosynthesis

reason must relate to difference

(c) **(i)** red blood cell –

1 has haemoglobin;

2 biconcave shape;

3 no nucleus;

any one – 1 mark [1]

(ii) 1 carries oxygen;

2 increases surface area for absorption/release of oxygen;

3 can hold greater amount of haemoglobin;

advantage must relate to difference

any one – 1 mark [1]

[Total: 9]

7 **(a)** a catalyst/chemical that alters/speeds up the rate of a reaction;

biological/made by cells/made of protein;

A – biocatalyst as = biological catalyst

(b) suitable scales added to axes (uses more than half of the grid);

points plotted accurately (+/– half square);

points joined appropriately (from point to point or smooth curve of best fit); [3]

I – extrapolation back to zero

(c) stomach; [1]

(d) no reaction/rate of reaction 0;

boiling/high temperature would have denatured/destroyed enzyme; [2]

R – killed enzyme

[Total: 8]

8 **(a)** 1 iron for the formation of haemoglobin/red blood cells;

2 which carries oxygen;

3 vitamin D for absorption/deposition of calcium (ions);

4 calcium used in formation of bones/teeth;

any three – 1 mark each [3]

(b) constipation;

too little/lack of fibre/roughage in diet;

intestinal muscles lack bulk to push against;

obesity/excess overweight;

too much/more than needed carbohydrates/fats in diet;

excess stored as fat/adds to bulk of body;

coronary heart disease/heart attack/atherosclerosis;

too much (saturated) fat/cholesterol in diet;

causes blockages in coronary vessels/arteries;

any four from two effects only – 1 mark each [4]

accept other malnutrition effects e.g. nutritional marasmus, kwashiorkor, etc. and up to two explanatory points;

[Total: 7]

9 **(a)** 1 allows enzymes to work at constant rate;

2 allows constant rate of metabolism/reaction;

3 metabolism independent of (external) environment/OWTTE;

4 can live in many situations/example of extreme temperature conditions;

any two – 1 mark each [2]

(b) 1 (sweating) releases water onto skin;

2 (water/sweat) evaporates;

3 ref to latent heat/heat energy needed for evaporation;

4 reduces skin temperature/removes heat from blood;

5 increased (body) temperature – increased sweating;

6 prevents overheating/returns (body) temperature to normal/cools body;

any four – 1 mark each [4]

[Total: 6]

10 **(a)** **(i)** stomata/between guard cells; [1]

(ii) xylem (vessels); [1]

(b) **(i)** A;

(increased air movement) increases transpiration; [2]

(ii) C;

(rise less steeply) because of no air movement/(falls as) air is humid/saturated; [2]

[Total: 6]