UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME FOR the October/November 2006 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 students, 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.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

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

CIE is publishing the mark schemes for the October/November 2006 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

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1 bird *linked to* body with feathers, one pair of wings;

fish *linked to* body with scales, with fins;

mammal *linked to* body with hair, two pairs of limbs;

reptile *linked to* body with scaly skin, two pairs of limbs or no limbs; **[4]**

mark "class" end of line
two lines starting from a "class" – no mark for that "class"
two (or more) lines ending at same "description" – if one is correct then award mark

Total: [4]

2 (a) urine / faeces / excreta / human waste;

from toilets / sinks / washing machine / showers / baths / OWTTE;

can include street water / industrial / agricultural waste etc; I – fertilizers A – factories

Any two – 1 mark each **[2]**

(b) can carry disease organisms / pathogens / bacteria; R – spreading of disease

e.g. cholera / typhoid / dysentery / other waterborne diseases / bilharzia; A – diarrhoea

risk of infection if water is used; I – refs to catch disease unqualified A – drinking water / swim in water / washing clothes

can lead to eutrophication;

organic material / faeces / plant matter broken down by bacteria / microorganisms;

bacteria flourish / reproduce in large numbers;

use up oxygen / can become anaerobic / water becomes anaerobic;

loss / death / migration of **aquatic** animals (because of oxygen depletion);

(industrial) chemicals could be toxic to river organisms; A – toxic substance

Any four – 1 mark each **[4]**

Total: [6]

3 (a) (i) (primary consumer) locust / impala / seed eating bird; **[1]**

(tertiary consumer) baboon / tick bird; **[1]**

(producer) grass; **[1]**

(ii) grass ≡ locust ≡ scorpion ≡ baboon ≡;
(must relate to food chain of six organisms because there are 6 levels) **[1]**

(b) tick; **[1]**

(c) 1. lots of locusts **as food** for scorpions / many locusts and food;

2. more scorpions survive / scorpion population increases;

3. more **food** for baboons;

4. baboon numbers increase; (points 1-4 ORA)

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5. grass eaten / destroyed (by locusts);

6. impala numbers reduced;

7. less food for leopards;

8. eat more baboons;

9. baboon numbers decrease; (only if correctly qualified)

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10. accept no change in baboon numbers if correctly qualified;

Any four – 1 mark each **[4]**

For candidates who interpret 'plague' as a disease of locusts and base their predictions on a drastic fall in locust numbers instead of a rise, apply the mark scheme below. Candidates only gain credit for **one** interpretation of the term 'plague'.

1. fewer locusts;
2. more grass available for impala;
3. numbers of impala increase;
4. leopards eat more impala;
5. baboon numbers increase;
6. baboons must eat scorpions;
7. less food for scorpions;
8. fewer scorpions;
9. less food for baboons;
10. baboon numbers decrease.

Any four – 1 mark each

Total: [9]

4 (a) (i)

mass of berry in g	number of individuals
1.2	9;
1.3	11;

[2]

(ii) **L** correct labelling; (frequency / number of berries / number of individuals)

Sy suitable scale on Y axis (1-6);

Sx correct scale on X axis (start with 0.3);

(above marks points apply to all types of graph)
(mark points below ONLY apply to histograms – not line graphs)

plotting correct of 10 bars /columns;

plotting correct of remaining 4 bars / columns;
(accept plotting of candidates values in (a)(i) if not 9 or 11)

bars / columns continuous / touching;

Any five – 1 mark each **[5]**

(b) continuous variation;

there are a range of masses / many different masses /
gradual gradation of mass; **[2]**

(ref. to discontinuous variation negates whole answer to **(b)**)

Total: [9]

5 (a) (i) petal clearly labelled; R – arrows **[1]**

(ii) sepal clearly labelled; **[1]**

(iii) stamen (anther or filament) clearly labelled; **[1]**

(b)

insect pollinated flower	wind pollinated flower
nectary / nectar present	no nectary / nectar;
has a scent	no scent;
stigma enclosed	stigma hanging out;
stigma plain / OWTTE	stigma feathery;
stamens / anthers enclosed	stamens / anthers hanging out;
large / sticky / less pollen	small / dry / more pollen;
large petals	small petals;

A smell

I – refs. to carpel
Any three rows – 1 mark each **[3]**

(c) (i) at stigma; **[1]**

(ii) in ovule / ovary; I – ovum **[1]**

(d) <u>seeds / seedlings at B</u>

1. (parent) shades seedlings;
2. less / insufficient photosynthesis;
3. (roots of parent) absorb lots of water;
4. absorb lots of mineral / ions / salts;
5. ref. to competition between seedlings and parent;
6. restricts potential for growth / cannot grow well;
7. accept other valid points such as allelopathy;

(<u>ORA for seeds / seedlings at A</u>)

Any four – 1 mark each A – argument for A and B mixed **[4]**

Total: [12]

6 (a) (i) **X** – molar; I – ref. to premolar

Y – canine;

Z – incisor; **[3]**

(ii) **X** for grinding / crushing / chewing food;

Z for biting / nibbling / cutting off food; I – slicing **[2]**

(b) mineral – calcium / phosphate / fluoride;

vitamin D; I – ref. to Vitamin C **[2]**

(c) (i) bacteria use sugars for <u>energy</u> source;

produce / release (lactic) acid;

acid erodes / dissolves / breaks down / eats away enamel;

erosion / cracking / chipping of enamel <u>exposes dentine</u>;

access to dentine if gums damaged;

Any three – 1 mark each **[3]**

(ii) regular brushing of teeth / three times a day / after every meal;

use of mouthwash / flossing;

regular dental check ups; A – once a month

avoid too much sweet food; A – reduce

ref. to use of use fluoride; R – fluorine (toxic)

chew crisp fruit / vegetables / sugar free gum / named example of crisp food;

do not try to crack nuts / ice cubes;

Any three – 1 mark each **[3]**

Total: [13]

7 (a) arteries have <u>thicker</u> walls / ORA;

arteries have <u>more</u> muscle / elastic tissue / ORA;

only veins have valves;

arteries have a smaller lumen / ORA;

Any two – 1 mark each **[2]**

(b) (i) pulmonary artery; A – umbilical artery **[1]**

(ii) urea added at liver;

urea removed at kidney; **[2]**

(c) (i) twice / two times / 2; **[1]**

(ii) avoid stress;

eat little (animal) fat; R – do not eat too much fat R – reduce fat / cholesterol
A – eat foods that are low in fat / cholesterol A – avoid eating fatty food

do not smoke;

take exercise;

eat little salt;

avoid obesity;

avoid excessive alcohol;

Any three – 1 mark each **[3]**

Total: [9]

8 (a) (i) to trap / capture / absorb light / convert light energy to chemical energy; A – take in light **[1]**

I – refs. to catch light / hold chlorophyll / make starch / food etc

(ii) more in upper part of mesophyll / palisade layer / palisade mesophyll; A – increase amount of light taken in

to get maximum absorption of light / nearer the light / closer to light;

arranged in cells to avoid overlap / orientated at right angles to light; (refers to choloroplasts)
Any two – 1 mark each **[2]**

(iii) (open) stomata allow diffusion / entry;

of carbon dioxide;
(CO_2 into leaf – 2 marks
CO_2 and oxygen moving in and out – 2 marks
oxygen and CO_2 moving in and out – 1 mark)

stomata open in the light / during day;

spaces allow circulation / diffusion of gas / carbon dioxide;

distribution / availability to <u>all</u> mesophyll cells / reach all mesophyll cells;

I refs. to oxygen / water / transpiration

Any three – 1 mark each **[3]**

(b) (i) phloem / sieve tubes / phloem tubes; **[1]**

(ii) nitrates / ammonium; R – nitrogen / nitrogenous material / ammonia **[1]**

Total: [8]

9 (a) (i) the movement of molecules / particles / ions;

from a higher to a lower concentration/ down concentration gradient; **[2]**

(ii) because there is a lower concentration in the blood than in the air /

in the alveolus / ORA; **[1]**

(iii) large surface area;

thin surface / wall / wall one cell thick; R - cell walls

moist surface;

rich blood supply;

Any three – 1 mark each **[3]**

(b) (i) concentration difference / gradient between air and blood smaller / less steep;

less / slower diffusion / diffusion rate lower;

less oxygen absorbed;

Any two – 1 mark each **[2]**

(ii) (more red blood cells means) more oxygen carried;

allows greater rate of respiration (in muscles / tissues); R – ref to breathing

leads to greater energy release;

could allow better performance / OWTTE;

Any two – 1 mark each **[2]**

Total: [10]