UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE O Level

MARK SCHEME for the May/June 2006 question paper

5090 BIOLOGY

5090/02   **Paper 2**   **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 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*.

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Section A

1 (a) *mark awarded only if structure is in a plausible position*

    (i) nucleus/cytoplasm/(shown in both cells)   ;

    (ii) Any 2 from: chloroplast/wall/(cell) sap/membrane   ;;   **[3]**

(b) (i) photosynthesis   ;

        manufactures or stores CHO/sugar/glucose/cellulose   ;   **[2]**

    (ii) liver/muscle   ;

        *storage/cells contain   ;

        *<u>glycogen</u>   ;   **[3]**
        (*mark separately from liver/muscle mark*)

    (iii) muscles largely protein/contain fat   ;

        skin largely protein   ;

        animal cells/tissues/skin stores fat   ;

        fat insulates against heat loss   ;   **[max 3]**

2 (a) hormones   ;

    <u>target</u>   ;   **[2]**

(b) 1. C/blood glucose rises   ;

    2. E/heart beat increases   ;   **[2]**

(c) (i) I (or otherwise identified)   ;

        greatest control over sugar level/smallest fluctuations AW   ;

        at lowest (blood glucose) level   ;

    (ii) H   ;

        greatest fluctuations/little control over sugar levels   ;   **[max. 4]**

(d) lungs   ;

    alveoli/air sacs   ;

    <u>diffusion</u>   ;

    into <u>capillaries</u>   ;   **[max 3]**

3 (a) <u>pollen</u>   [1]

   (b) by insect   ;

       grain sticky/rough AW   ;

   (c) fusion AW   ;

       male and female   ;

       gametes/nuclei/sex cells   ;

       fertilisation   ;

       ref. food storage   ;

       mitosis/growth   ;

       embryo development   ;   **[max 4]**

   (d) (seed) dispersal (ignore refs. to wind)   ;   **[1]**

4 (a) any 2 from : urination/exhaling or breathing out/faeces/
       bleeding or crying or vomiting   ;;   **[2]**

   (b) (i) higher when walking (or v.v.)/quoted figures   ;

           more energy/heat released/raises body temperature   ;   **[2]**

       (ii) lower when clothed (or v.v.)/quoted figures   ;

           greater humidity next to skin/(v.v.) less skin exposed/
           clothes deflect or absorb heat AW   ;   **[2]**

       (iii) higher in sun (or v.v.)/quoted figures   ;
            higher temperatures in direct sunlight/higher rate of evaporation   ;   **[2]**

   (c) more energy released/respiration/work done by   ;

       muscles   ;   **[2]**

5 (a) (i) 105   ;   **[1]**

       (ii) genes/alleles (A any given pair of contrasted characters)   ;   **[1]**

       (iii) to prevent choice/bias/so results are random   ;   **[1]**

   (b) (i) red + **W**   ;   **[1]**

       (ii) ref. both cubes and both flowers being the same/heterozygous AW/
            the only way to produce both colours of offspring/gives all
   genetic combinations AW   ;   **[1]**

(c) (i) T t + red*

        (x)   tt + yellow*   ;

<u>gametes</u>   ;

gametes correctly shown (need be once only for tt)   ;

genotypes of offspring correctly derived (* A colour tie-up here)   ;   **[max. 4]**

(ii) 3 x T + 3 x t on one cube + 6 x t on the other   ;   **[1]**

The maximum for Section A = 50 marks

Section B

6 (a) active site   ;

of specific shape AW   ;

substrate   ;

fit/are complementary   ;

any ref. enzyme/substrate complex being like lock and key   ;

stress on substrate molecule   ;

product formed   ;

also works in reverse   ;   **[max 5]**

(b) reaction rate increases   ;

similar to key turning more often   ;

more energy/faster movement of molecules   ;

active site changes shape   ;

proteins are denatured by heat AW   ;

permanently   ;

reaction stops   ;

substrate no longer fits active site   ;

key no longer fits lock   ;   **[max 5]**

[Total = 10]
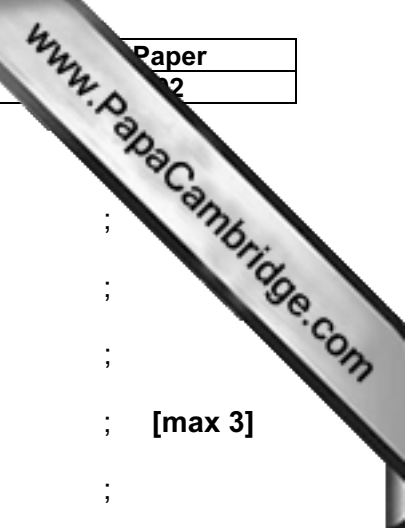
7 **(a)** named e.g. of bacterial disease

named method of administration ;

antibiotics kill only bacteria ;

must continue with course until all bacteria are eliminated ;

named antibiotic ; **[max 3]**

(b) fermenter/vat/large container ;

culture medium ;

addition of organism (fungus or bacterium) ;

controlled temperature ;

provision of oxygen ;

conditions optimum/controlled for maximum production ;

extraction of antibiotic ;

purification ; **[max 7]**

[Total = 10]

8 **E** **(a)** traps/harnesses/absorbs ;

sunlight ;

energy ;

for photosynthesis ;

which makes carbohydrate AW ; **[max 4]**

(b) large surface area ;

for maximum/rapid ;

uptake of water ;

by osmosis/diffusion ;

of ions/salts/minerals ;

by active transport ;

oxygen ;

for root respiration ; **[max 6]**

[Total = 10]
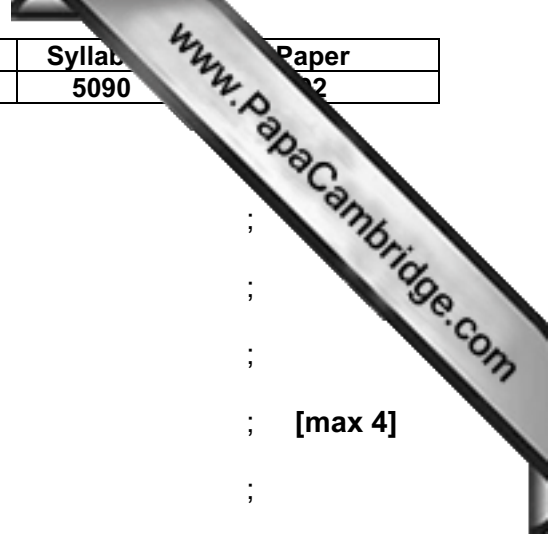
8 O (a) absorbs + quickly

and carries   ;

oxygen   ;

as oxyhaemoglobin   ;

in red blood cells   ;   **[max 4]**

(b) large surface area   ;

uptake from ileum/small intestine   ;

*of amino acids   ;

*of glucose   ;

into blood capillaries   ;

*fats/fatty acids/glycerol   ;

into lacteals   ;
(* *allow one for digested foods*)   **[max 6]**

[Total = 10]