UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

5090 BIOLOGY

5090/61 Paper 6 (Alternative to Practical), maximum raw mark 40

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International Examinations

1 (a) (i) Graph marks:
light intensity on *x*-axis, carbon dioxide intake on *y*-axis ;
x-axis labelled light intensity / arbitrary units and *y*-axis labelled carbon dioxide intake / arbitrary units ;
good linear scales including positive and negative values ;
clear and accurate plotting ;
connections ruled / smooth line of best fit ; [5]

(ii) carbon dioxide intake or photosynthesis (rate) ;
increases with increased light intensity ;
up to 6–11 arbitrary units ;
light limiting photosynthesis ;
at higher light intensities carbon dioxide intake / photosynthesis rate remains constant ; R. stops
carbon dioxide or another factor limiting (photosynthesis) ; [max 4]

(iii) 0.5–0.9 arbitrary units ; [1]

(iv) photosynthesis absorbing CO_2 + respiration producing CO_2 ; at same rate ; [2]

[Total: 12]

2 (a) wings ;
veins ;
legs ;
segments / joints ;
head / thorax / abdomen / three body regions ;
antennae / head appendages ;
eyes ; R. spiracles mouthparts [max 4]

(b) comparable but contrasted pairs:
4 wings : 2 wings ;
thick or hairy legs : thin or smooth legs ;
short / thick legs : long / thin legs ;
hairy legs : smooth legs ;
4 forward / 2 backwards facing legs : 2 forward / 4 backwards facing legs;
large eyes : small eyes ;
short or simple antenna : long or 'furry' antenna ;
rear end forked : rear end not forked or pointed or simple AW ;
mouthparts absent : mouthparts present AW ; [max 4]

(c) 63–69 mm ;
correct expression – measurement over 40 ;
magnification well expressed × or times up to 2 dp no units [3]

[Total: 11]

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3 **(a)** **(i)** and **(ii)**
add iodine solution ;
turns (blue) black ;
add biuret reagent ;
(from blue to) mauve / violet / lilac / purple ; [4]

(b) **(i)** protease / enzyme (digests protein) ;
amino acids formed ; R. nitrates
movement through phloem / translocation ; [3]

(ii) (on Fig. 3.1) arrow(s) drawn in cotyledon towards embryo ; [1]

(c) secretion contains protease/enzyme ;
insect's body (content) digested ;
into amino acids ;
used by plant ; [max 3]

(d) **(i)** for amino acid / protein formation ;
for growth / repair ;
for chlorophyll / green leaves / prevent yellow leaves ; [2]

(ii) (culture) solution with no nitrogen / nitrate ;
(control) solution with nitrates / nitrogen ;
ref. aeration / topping up ;
suitable use of lid ;
same size / species of plant used ;
with same light / temperature / grown for same time period ;
pale or yellow leaves / poor root system / stunted stature of plant lacking nitrates or converse ; [max 4]

[Total: 17]

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