UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

5090 BIOLOGY

5090/62 Paper 6 (Alternative to Practical), maximum raw mark 40

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Abbreviations

Mark schemes will use these abbreviations:

ora	or reverse argument
A	accept
R	reject
;	separates marking points
/	alternatives
AW	alternative wording
ref.	reference

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1 (a)

Table 1.2		
maximum width leaf / mm		
	sunlight	shade
1	**25**	66
2	46	76
3	40	64
4	50	75
5	49	77
6	34	59
mean		

1. Measurements recorded in all 12 boxes ;

2. Measurements in mm (mm need not be written) ;
R cms **R** inches

3. sunlight 1 measurement in the range 24 to 26 ;
A 2.4 – 2.6 if all measurements in cm
A 0.9 – 1.1 if all measurements in inches

4. all 6 sunlight measurements less than corresponding shade measurement ; [4]

(b) (i) sunlight within the range 35 – 45 (inclusive)
+ shade within the range 65 – 75 (inclusive)
entered in Table 1.1 ; [1]
A inches or cm if ecf
R if more than 2 dps
R fractions

(ii) leaves in sunlight narrower / smaller **ORA** ;
A (correct) statements about development, growth, size, or surface area e.g.
more growth / development **ORA**
growth / development restricted or promoted
growth / development slower **ORA**
R measurements quoted without qualification
R leaves shrinking / decreasing

leaves in sunlight less green / less coloured / paler / fewer chloroplasts / less chlorophyll **ORA** ;
R grey / black unless qualified with paler / darker
R brighter

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(iii) *reliabilty*
(use) more leaves;
select leaves within each light intensity at random ;
(use) leaves from plants of same age ;
leaves from same plant / type of plant / genetic stock ;
measure leaves' height / length / surface area / mass ;

going on
use leaves from other species / other types of plant ;
compare chloroplast / chlorophyll content ;
compare starch content ;
include petiole length ;
use range of light intensities ; [3]

R put shade leaves in sun and vice versa
R repeat the measuring (to get mean/avoid error)

(c) (i) **palisade cells**:
two / more layers (sun) v one layer (shade) /
more cells (sun) v fewer / less cells (shade) /
fewer chloroplasts per cell (sun) v more (shade) /
chloroplasts far apart (sun) v close together (shade) ;
regular shape cells (sun) v irregular / varied, various shape (shade) ;

A uniform, non-uniform
R variable shape
R fixed shape

thickness of leaf: thicker / thick(sun) v thinner / thin / less thick (shade) ;

chloroplasts:
fewer (sun) v more (shade) /
far apart (sun) v close together (shade) /
all mesophyll cells have similar numbers of chloroplasts (sun) v palisade cells have more chloroplasts than other mesophyll cells (shade) ;
R any implication that all cells in the leaf contain chloroplasts

air spaces: more (sun) v fewer (shade) ; [4]
R refs. to shape or size of air spaces

(ii) correct ref. to photosynthesis ;
more chloroplasts / chorophyll to use all available light in shade / AW;
thinner leaf has shorter diffusion distances ;
larger surface area receives more light ;
more air spaces increases of CO_2 / gaseous exchange ; [2]

[Total: 16]

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2 (a) (i)

student	number of correct responses			
	finger tip	back of hand	palm of hand	forearm
1				
2		**5**		
3				
4				
mean	**9.75 / 9.8 / 10**		**8.25 / 8.3 / 8**	**6.25 / 6.3 / 6**

[2]

4 correct, 2 marks

one error, 1 mark

more than one error, 0

If 9.7 + 8.2 + 6.2 count as one error

(ii) reliability / detect any anomalies / so that a mean /average can be obtained ; [1]
A e.g. so that the result is doubtless
A ref. to statistical significance

(iii) (most sensitive) finger tip;
(least sensitive) forearm; [2]

(iv) more / fewer nerve endings / receptors present ;
nerve endings / sensory receptors closer together / farther apart ;
need for fingers to be more sensitive than forearm because of their function / AW ; [1]
R nerves / sensory nerves / neurones / sensory cells
R refs to thickness of skin / receptors nearer surface

[Total: 6]

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3 (a) (i) outermost drawn line clear, clean, with no obvious beginning and ending, representing good shape of granule, at least 7cms max. length ;
at least 3 layers indicated inside ; [2]

(ii) 1. at least one line drawn, either on Fig or drawing, to show where measurement taken + 2 correct measurements with correct units at least once ;

2. correct expression ;
image/object (AW) in words or with values e.g. $\frac{80}{55}$

3. allowance for x 500 ;

3. **A** e.g. $\frac{80}{0.11}$ i.e. 55/500

4. magnification correctly calculated with × or times and no units [4]

R answers expressed to more than 2dps

(b) (i) A – blue;
B – blue;
C – yellow / brown; [3]

(ii) A reducing sugar present ;
A **A** named reducing sugar **R**. sugar **R** carbohydrate

B protein present;
B **A** polypeptides

C starch present;
for either A or B – small amount /AW ; [4]
A a little, a trace, not very much etc.
R weak
R some unqualified e.g. some reducing sugar present
A some qualified e.g. some r s as not turned brick red

[Total: 13]

4 (a) (i) distinct chromosome correctly identified ; [1]

(ii) cytoplasm correctly identified ; [1]

(b) (i) meiosis / reduction division ; [1]
NB meiosis must be correctly spelt

(ii) haploid / half number of chromosomes / ensure no doubling of number of chromosomes at fertilisation ; [1]
R to maintain correct number of chromosomes

(c) anther / pollen / ovary / embryo sac / stamen / carpel / ovule ; [1]
A andrecium / gynesium / flower

[Total: 5]

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