UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2007 question paper

9700 BIOLOGY

9700/31   Paper 31 (Advanced Practical Skills 1),
             maximum raw mark 40

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.

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

CIE is publishing the mark schemes for the May/June 2007 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

UNIVERSITY *of* CAMBRIDGE
International Examinations

www.dynamicpapers.com

Page 2	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9700	31

1 (a) Two from:
Pale yellow/orange/orange brown;
(all) starch broken down/hydrolysed;
no lead nitrate to inhibit enzyme;   [max. 2]

(b) (i) Six from:
All data recorded in table;
Concentration of lead nitrate in first column/top row;
Column headings include concentration with percentage and colour;
At least three dilutions;
At least two readings for each solution;
Estimate of degree of blackness/differences in colour described;
Decrease in reaction with increasing lead nitrate/colour yellow/orange etc. to blue/black;
                                                                                      [max. 6]

(ii) Lead nitrate slows down the reaction/lead nitrate is an inhibitor;   [1]

(c) (i) Buffer/named example;   [1]

(ii) Two from:
Difficulty in judging colour;
Difficulty in having same time;
One example of inaccuracies in equipment/syringe;
Inaccuracies in preparing serial dilution;   [max. 2]

(d) (i) Reading should have been lower/AVP;
Accept reading anomalous/not reliable unqualified   [1]

(ii) (20+21+18)/3= 19.66666666etc.
should be 20 as only 2 sig. figs   [1]

(iii) O/A orientation and axes labels
transmission/arbitrary units on *x*-axis, lead nitrate/% on *y*-axis;   [1]

S scale data spans half of grid width and height, appropriate 1:10, 1:5, 1:2;   [1]
R awkward scales such as 3:10, 7:10, 8:10
A scales not starting at 0

P/L accurate plots within 1mm/half square, using crosses or circle with dot and line
points joined with straight ruled lines OR fine curve drawn through data points;   [1]

R any extrapolation beyond first or last point, line of best fit

(e) As lead nitrate concentration increases the activity of amylase decreases;   [1]

(f) IDEA that data does not support the student's hypothesis;
IDEA of enzyme becoming gradually denatured as lead nitrate concentration increases;   [1]

(g) Accept improvements that would enhance the reliability or accuracy
Three in outline or one or two explained??

Three from:
measure volumes accurately; using pipette ? is excuse
keep at same pH, using buffer;
use more replicates/repeat more times at each concentration;
use wider range of concentrations/particular %'s suggested;   [max. 3]

                                                                                 [Total: 22]

www.dynamicpapers.com

Page 3	Mark Scheme	Syllabus	Paper
	GCE A/AS LEVEL – May/June 2007	9700	31

2 (a) (i) *Ligustrum leaf*

Two from:
correct section recognisably drawn with correct orientation i.e. stomata at bottom;
proportions of layers correct i.e. palisade and mesophyll about 8/10 and epidermal layer less than 1/10;
vascular bundles shown; [max. 2]

(ii) Correct measurement of line shown on drawing to + or − 1 mm AND measurement of thickness of specimen 1 mm or less; [1]

Working shows measurement from drawing divided by measurement from slide; [1]

(iii) Their measurement from **(ii)** ± 0.2 and 0.5 mm; [1]

(iv) One from:
User not viewing at right angles;
Thickness of ruler lines;
Difficult to focus both ruler and specimen at same time; [max. 1]

2 (b) (i) Four at least:
At least half of area of available space used;
Two guard cells plus two epidermal cells;
Cuticle shown on epidermal cells;
Cells include cell walls;
Clear outline drawings, sharp pencil, no shading; [4. max]

(ii) Cells wider;
Cells deeper; [2]

(c) (i) Table used to present data;
R comparative lists

	T1	Fig 2.2
Location	Lower surface, None on upper surface,	Lower surface; None on upper surface;
Stomata	Closed,	Open;
Guard cells	Shape box-like, Level/below epidermis;	Come above epidermis;
Air space	different shape,	Same shape;
spacing	More epidermal cells between stomata,	Next to each other/fewer epidermal cells between stomata;
Midrib/vein	No stomata,	No stomata;
position	Not in grooves/leaf flat/not sunk;	In grooves/inside rolled leaf/sunken?;

[max. 4]

(ii) Stomata inside rolled leaf;
Hairs;
Leaf rolled;
Thick upper cuticle; [max. 2]

[Total: 18]