CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2013 series

9700 BIOLOGY

9700/31 Paper 3 (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, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Cambridge is publishing the mark schemes for the October/November 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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Mark scheme abbreviations:

;	separates marking points
/	alternative answers for the same point
R	reject
A	accept (for answers correctly cued by the question, or by extra guidance)
AW	alternative wording (where responses vary more than usual)
underline	actual word given must be used by candidate (grammatical variants excepted)
max	indicates the maximum number of marks that can be given
ora	or reverse argument
mp	marking point (with relevant number)
ecf	error carried forward
I	ignore

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1 (a) (i) at least three further concentrations made according to instructions
0.08 **+** 0.06 **+** 0.04 **+** (0.02);

correct volumes of ascorbic acid
(0.08) 16 **+** (0.06) 12 **+** (0.04) 8 **+** (0.02) 4;

total volumes made up 20; [3]

(ii) organised into table;

heading (column to left of data or top row) percent(age) or % concentration of ascorbic acid / **A** + (any column/row headed) time (/) s or sec(onds);

records results according to instructions i.e. for 0.10 + three further concentrations;

correct pattern of results records shortest time to end-point for highest concentration of A recorded;

records all results to whole numbers of seconds; [5]

(iii) cause of error + idea of error:

(independent)
range of concentrations **+** too narrow / not enough;

(dependent)
colour disappearance **+** not same or difficult to judge or varies or different;

timing **+** inaccurate as timing started when last piece put in;

(standardised)
size of agar piece / cutting **+** not same or varies or different;

agitating pieces of agar / ascorbic acid **+** not same or varies or different;

pieces of agar with stained side down or stick together **+** ascorbic acid not reaching indicator;

[max 2]

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(iv) (independent variable)
more or wider or different or larger or at least five different concentrations or gives five examples; **A** if no units **R** if incorrect units

(dependent variable)
use help or two people to record colour or video;
stagger start or do individually to prevent timing error;

(standardised variables)
cut agar block on graph paper or alternative method;
use electric or automatic shaker; [max 3]

(b) (i) line graph:
label on *x*-axis percent(age) ascorbic acid conc(entration /) % **+** label on *y*-axis vol(ume of) indicator (/) cm^3;

scale *x*-axis 0.2 to 2 cm labelled each 2 cm
+ *y*-axis 0.5 to 2 cm labelled each 2 cm;

correct plotting of five points as small cross or dot in circle;

ruled line of best fit through at least four plotted points **+** line less than 1 mm thick; [4]

(ii) shows clearly on graph with line or point on line;

estimate correct with reading at 0.86 cm^3 to 2 decimal places with %; [2]

[Total: 19]

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2 (a) (i) drawing and quality;

do not give mark for
- any shading
- any ruled lines
- smaller than 50 mm across widest dimension of largest enclosed area
- less than 3 lines

or any line
- is too thick
- has any feathery or dashed lines or gap in line
- has any overlaps;

no cells **+** correct quarter drawn;

layers of differing widths*;*

inner line drawn with indentations;

uses label line with label to muscle tissue; [5]

(ii) lumen; **+** presence of blood cells or AW or to ease flow or allow free movement of blood or less resistance;

thick (muscle) wall; **+** wall to withstand pressure or hold blood;

inner surface folded or crinkled or irregular **+** to allow tube to expand or widen or dilate; [max 2]

(b) (i) marks on blood cells counted in correct eighth;

shows number of whole cells counted multiplied by 8; [2]

(ii) correct measurement of line **r** + units mm;

correct answer for area to correct number of significant figures;

(measurement divided by 200)^2 × 3.14) [2]

(iii) shows number of blood cells (**(b)(i)**) divided by area (from **(b)(ii)**);

rounded to whole number for answer; [2]

(iv) as altitude / height increases (ascends) average number of red blood cells / rbc increases or rbc produced at faster rate;

as ascend / at altitude air is thin or less oxygen;

extra red blood cells help to supply enough oxygen to tissues or idea more oxygen carried; [3]

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(c) drawing and quality;

do not give mark
- any shading
- any ruled lines
- smaller than 20 mm across widest dimension of largest cell
- less than 4 enclosed areas

or any line
- is too thick
- has any feathery or dashed lines or gap in line
- has any overlaps;

draws only four whole cells + two of each type;

cells shown with correct relevant sizes;

(details of) nucleus different between two cells of one type of wbc (lobed nucleus in the two cells);

uses label line with label to one nucleus; [5]

[Total: 21]

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