**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Advanced Subsidiary Level and GCE Advanced Level**

# MARK SCHEME for the May/June 2013 series

## 9700 BIOLOGY

**9700/35** Paper 35 (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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**1 (a) (i)** [2]

MMO decisions 2

mp1 (shows correct use of 20 % glucose)
adds 6, 8, and 10 $cm^3$ of 20 % glucose to prepare correct final concentration of glucose;

| volume of 20 % glucose solution / $cm^3$ | final percentage concentration of glucose |
|---|---|
| 6 | 6 |
| 8 | 8 |
| 10 | 10 |

mp2 (shows the correct use of distilled water)
adds 14, 12 and 10 $cm^3$ of (distilled) water/W to prepare correct final concentration of glucose;

| volume of distilled water / $cm^3$ | final percentage concentration of glucose |
|---|---|
| 14 | 6 |
| 12 | 8 |
| 10 | 10 |

**(ii)** [1]

MMO decisions 1

1 sec (onds) or s;

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| | | |
|---|---|---|
| **(iii)** | | [1] |
| MMO decisions 1 | 1 | volume of **S** or **PM** or **U1** or **U2** or ( glucose ) solution<br>OR<br>5 cm$^3$ **S** or 2 cm$^3$ **PM** or 10 cm$^3$ **U1 / U2** / solutions ; |
| **(iv)** | | [4] |
| ACE improvements 1 | mp1 | use syringe ; |
| MMO collection 1 | mp2 | records start and end-point times for **U1** and **U2**; |
| MMO decisions 1 | mp3 | start time for **U1** is before **U2**; |
| PDO recording 1 | mp4 | all readings to the same precision; |

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| | | | | |
|---|---|---|---|---|
| **(v)** | | | | [1] |
| ACE interpretation 1 | 1 | time taken for the 6 % glucose solution to reach end-point in sec(onds) or s ; | | |
| **(vi)** | | | | [4] |
| PDO recording 2 | mp1 | table with all cells drawn | **AND** heading (top or left)<br>percent(age) conc(entration) of glucose; | |
| | | **Can have**<br>• no outer boundary<br>• %<br>• test tube/ additional columns or rows<br>• notes outside the area | | **Do not give mark if**<br>• units in cells of headed column/row<br>• other units e.g. mol $dm^{-3}$<br>• no units |
| | mp2 | (heading)<br>time (/) s or sec(onds); | | |
| MMO collection 2 | mp3 | for 6 concentrations including **U1** and **U2**<br>records only processed results as whole numbers; | | |
| | mp4 | highest concentration of glucose solution is shortest time compared to 6 %, 8 % and 10 % glucose solution; | | |

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**(b)** [1]

| | | |
|---|---|---|
| ACE interpretation 1 | 1 | glucose tolerance test solution; |

**(c) (i)** [1]

| | | | | |
|---|---|---|---|---|
| ACE interpretation max 1 | | | cause of error | WITH idea of error |
| | | mp1 | (dependent)<br>change to colourless/end-point | difficult to judge see or identify or determine or is subjective may be different; |
| | | mp2 | (standardised)<br>measuring the potassium manganate (**PM**) | difficult to read the syringe due to darkness of **PM**; |
| | | mp3 | (standardised)<br>mixing of **S** and glucose | not the same or varies or different; |
| | | mp4 | (idea of) reaction | too quick<br>or<br>describes more concentrated solution goes too quickly; |

**(ii)** [max 2]

| | | | |
|---|---|---|---|
| ACE improvements max 2 | max 2 | mp1 | (independent variable) (concentration of glucose)<br>*idea of*<br>use more or different or wider/narrower range of concentrations; |
| | | mp2 | repeat more than once/replicates to obtain three readings; |
| | | mp3 | use a colorimeter<br>or<br>*idea of* individual timing/ set each one up separately; |

**[Total: 17]**

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**2 (a) (i)** [2]

MMO collection 2

mp1 (collects correct values for each tissue, **J**, **K**, **L** and **M**)

| J | M | N | P |
|---|---|---|---|
| Ignore | 4–6 | 26–28 | 4–6; |

mp2 any four values which add up to 43;

**(ii)** [3]

**Ignore** any labels / label lines / brackets

PDO Layout 1

mp1 suitable plan diagram **AND** clear, sharp, unbroken lines;

**Do not give mark if**
- any line outside the two given drawn lines left and right
- any line off the grid
- any shading
- any ruled line

**Do not give mark if**
- less than 3 lines

**or if any line**
- any part of the line 1 mm or thicker
- any feathery or broken or dashed line or gap
- any tail or overlap

PDO recording 1

mp2 any line completing the top edge of the vascular bundle between the two drawn lines;

MMO decision 1

mp3 (draws correct proportions and shape of layers)
width of layers **N** is at least double the combined width of **J** and **M** measured along line;

**(iii)** [2]

PDO display 2

mp1 shows counting of all the 1 cm × 1 cm squares half or more only within the completed outline on Fig. 2.2;

mp2 number clearly linked to bundle
**and** number clearly linked to xylem
**AND**
larger whole number to smaller whole number
or
as fraction larger number over smaller number;

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| **(b)** | | [5] |
|---|---|---|
| PDO layout 1 | mp1 | suitable drawing; |
| | | **Do not give mark if**<br>• any shading<br>• draw over the print of the question<br>• any ruled lines<br>• less than 40 mm at widest distance across largest cell<br>• less than six enclosed areas<br>**or if any outer lines (of enclosure)**<br>• are thicker than 1 mm<br>• are feathery or broken / dashed or have gaps<br>• have tails or overlaps |
| MMO collection 3 | mp2 | only 6 complete cells drawn **AND** as two groups of 3 touching cells; |
| | mp3 | the largest dimension of the biggest cell from near the centre of the stem is at least 3 times the smallest dimension of the smallest cell from the corner *;* |
| | mp4 | in one group of three cells, all cells must be drawn with double lines all the way round<br>**AND**<br>where two pairs of cells touch there must be 3 lines (representing the middle lamella); |
| MMO decision 1 | mp5 | one correct label cell wall, with one label line which must touch outermost line of a cell or finish between the two cell wall lines; |

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| | | | | | |
|---|---|---|---|---|---|
| **(c)** | | | | | [max 4] |
| PDO recording 1 | 1 | organise as a table with only three columns or rows separated by lines (no cells needed) | **AND** headed L1 and Fig. 2.3 | **AND** third column contains features; | |
| | | *Additional guidance*: column/row with features can be left, right or in middle and does not require heading J1 Fig. 2.3 | | | |
| ACE interpretation max 3 | max 3 | | feature | L1 | Fig.2.3 |
| | | mp1 | vascular bundles tissue/xylem | fewer/few separate bundles/ring/in the corners | many/more ring/separate bundles; |
| | | mp2 | hollow centre/pith (some slides) | present or has or yes | absent or does not have or no(ne); |
| | | mp3 | thickening/collenchyma sclerenchyma/ fibres/described | present or has or yes or in corner or forms bumps | absent or does not have or no(ne); |
| | | mp4 | Idea of gaps/air spaces | absent or does not have or no(ne) | present or has or yes; |
| | | mp5 | outer layer(s)/cortex/ epidermis | thick(er ) or idea of regular cells | thin(er) or idea of irregular cells; |

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**(d) (i)** [4]

*if line graph drawn award only mp1*

PDO layout 4

| | | |
|---|---|---|
| mp1 | *x*-axis<br><br>type of plant tissue | **AND** *y*-axis<br><br>concentration of glucose arbitrary units or [glucose] arbitrary units; |
| mp2 | even width of blocks | **AND (**0 at origin)<br>1.0 a.u. to 1 cm labelled 2.0, 4.0, 6.0<br>(ignore 0.0 at the origin or 8.0); |
| mp3 | correct plotting of each blocks in the order in the table with a<br>• horizontal,<br>• ruled,<br>• even line, less than 1 mm; | |
| mp4 | all blocks separated by a space (could be uneven)<br>quality – vertical lines<br>• ruled,<br>• smooth line less than 1 mm<br>• meets horizontal line exactly | **AND**<br>labelled with any clear labels A,B,C,D,E<br>e.g. must be directly below correct bar or inside bar or shaded with key; |

| | |
|---|---|
| **A** | 2.0 |
| **B** | 6.5 |
| **C** | 4.2 |
| **D** | 5.6 |
| **E** | 3.2 |

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| | | | |
|---|---|---|---|
| **(ii)** | | | [3] |
| ACE interpretation 1 | mp1 | *idea of*<br>concentration of glucose (inside the cells) is different/not the same (for each type of plant tissue)<br>or<br>gives figure for each plant tissue<br>or<br>compares two different tissues using figures<br>or<br>concentration of glucose is highest in cells in plant tissue B and lowest in plant tissue A; | |
| ACE conclusion 2 | mp2 | glucose is absorbed against a concentration or diffusion gradient/glucose did not move out of cells; | |
| | mp3 | <u>active transport</u><br>or<br>no <u>diffusion</u> or <u>diffusion</u> prevented; | |
| | | | **[Total: 23]** |

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