**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

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

# MARK SCHEME for the May/June 2012 question paper

# for the guidance of teachers

## 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, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2012 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

UNIVERSITY of CAMBRIDGE
International Examinations

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 |
| **ACE** | Analysis, Conclusions and Evaluation (skills) |
| **MMO** | Manipulations, Measurement and Observation (skills) |
| **PDO** | Presentation of Data and Observations (skills) |

© University of Cambridge International Examinations 2012

| Expected Answers | | | | |
|---|---|---|---|---|
| **1 (a) (i)** | | | | [4] |
| PDO layout 1 | **mp 1** | no shading<br>or<br>dashed line inside cell | **AND**<br>50 mm or larger across widest point in one cell | **AND** clear, sharp, unbroken lines for all outer lines of the cells drawn;<br>**Do not give mark if**<br>• **less than** two outer lines i.e. only 1 cell<br>**or if any outer line has**<br>• any ruled lines<br>• any line more than 1 mm<br>• any feathery or broken / dashed or gap in outer line<br>• any 'tail' or overlap<br>• drawn over the print of question |
| MMO collection 2 | **mp 2** | only <u>two</u> whole cells | | **AND** adjacent walls touching; |
| | | | | **Do not give mark if**<br>• any ruled lines |
| | **mp 3** | cell contents drawn away from cell wall in at least one cell | | **AND** cell wall double line with middle lamella between cells; |
| | | | | **Do not give mark if**<br>• additional organelles e.g. mitochondria, etc. |
| MMO decision 1 | **mp 4** | only correct label, with label line(s) which<br>• touches but does not cross the cell membrane<br>• has at least one cell membrane drawn; | | |
| | | | | **Do not give mark if**<br>• any labels are not of cell structure<br>• any label within drawn area |
| | **(a) (ii)** | | | [2] |
| MMO decisions 2 | **mp 1** | idea of more than one cell; | | |
| | | | | |
| | **mp 2** | counts plasmolysed or counts cells in different states of plasmolysis; | | |
| | | | | **Do not give mark for**<br>• qualitative description only of states of plasmolysis or assigning numbers to each state |

© University of Cambridge International Examinations 2012

**(b) (i)** [5]

***Ignore*** *all references to conclusions i.e. concentrations*

| | | | |
|---|---|---|---|
| PDO recording 2 | **mp 1** | table with all cells drawn | **AND** heading<br>• solution or sample; |
| | **mp 2** | (any correct heading – column or row) number / count(ed) | **AND** plasmolysed; |
| MMO collection 2 | **mp 3** | records for <u>S1, S2 and S3 in this order</u><br>• more than one cell | quantitative data<br>• number of plasmolysed cells; |
| | **mp 4** | records correct pattern in context of cells not pieces / tissues ;<br>**S1 c**ompared to both **S2** and **S3**<br>most plasmolysis number of cells counted | |
| MMO decision 1 | **mp 5** | recorded quantitative data for at least three cells, for each concentration; | |

**(b) (ii)** [1]

| | | | |
|---|---|---|---|
| ACE interpretation 1 | | S2 (0)<u>.25</u> | **AND** S3 (0)<u> .5 </u>(0); |

© University of Cambridge International Examinations 2012

**(b) (iii)** [max 2]

ACE interpretation MAX 2

**mp 1**

*S2/S3*
*From bii*

because fewer plasmolysed cells or more non-plasmolysed cells or less plasmolysis; idea of

***OR***
*S2/S3*
*From bii*

more plasmolysed cells or fewer non-plasmolysed cells or more plasmolysis;

***OR***

comparison of <u>S2 and S3;</u>
**or**
<u>0.25 and 0.50</u> (units not needed);

**mp 2**

*idea of*
***SO***
lower
or
lowest concentration
or
0.25 (units not needed);

***SO***
higher
or
highest concentration
or
0.50 (units not needed);

more or less
less plasmolysed / plasmolysis;

© University of Cambridge International Examinations 2012

| | | | |
|---|---|---|---|
| **(c) (i)** | | | [3] |
| MMO collection 1 | **mp 1** | draws <u>only</u> two cells | **AND** adjacent walls touching;<br><br>**Do not give mark if**<br>• any ruled lines |
| PDO recording 1 | **mp 2** | draws cell contents filling **more** of cell than in **(a)(i)**; | |
| MMO decision 1 | **mp 3** | label cell wall (drawn with two lines all round) with label line to outermost line or between two lines; | |
| **(c) (ii)** | | | [2] |
| ACE conclusions 2 | **mp 1** | *For any correct reference in context of water moving* <u>osmosis</u>*;* | |
| | **mp 2** | <u>(in correct context of cells being in water NOT solution)</u><br><br><u>water potential / ψ</u> outside higher or less negative<br>**or**<br><u>water potential / ψ</u> inside lower or more negative<br>**or**<br>down <u>water potential gradient</u>; | |
| **(d)** | | | [max 3] |
| ACE improvements MAX 3 | **mp 1**<br>**mp 2** | (independent variable)<br>at least two examples (less than 1.0 and not 0.5 or 0.25) ;; | |
| | **mp 1 only** | (without examples)<br>increase or more or different or range of concentrations or solutions; | |
| | **mp 3** | draw graph of molarity<br><br>**or**<br><br>ref. to idea of calculate water potential*;* | |
| | | | **[Total: 22]** |

© University of Cambridge International Examinations 2012

| | | | | |
|---|---|---|---|---|
| **2 (a) (i)** | | | | [4] |
| PDO layout 1 | **mp 1** | no shading | **AND** larger than 50 mm across widest point | **AND** clear, sharp, unbroken lines for two outermost enclosed areas ;<br>**Do not give mark if**<br>• **less than** two hand drawn enclosed areas<br>**or in either of the two outermost enclosed areas has**<br>• any ruled lines<br>• any line 1mm or thicker<br>• any feathery or broken or dashed or gap in line<br>• any 'tails' or overlaps or gaps<br>• drawn over the print of question |
| MMO collection 2 | **mp 2** | no cells | | **AND** drawn at least two enclosed areas and at least one area shown in middle; |
| | | | | **Do not give mark if**<br>• drawn 3-D |
| PDO recording 1 | **mp 3** | (detail of observable feature)<br>central area drawn with irregular feature (not a circle); | | |
| MMO decision 1 | **mp 4** | skin as at least two lines*;* | | |
| **(a) (ii)** | | | | [1] |
| MMO decision 1 | | *with annotation* any area other than skin stained black or black / blue; | | |
| | | | | **Do not give mark if**<br>• annotated within drawn area |
| **(a) (iii)** | | | | [1] |
| ACE conclusion 1 | | area with black / blue stained / changed | | ***AND***<br>area orange or yellow unstained / unchanged / no change; |

© University of Cambridge International Examinations 2012

| **2 (b) (i)** | | | [3] |
|---|---|---|---|
| MMO decision 1 | **mp 1** | Shows at least three large values | and at least three smaller values; |
| | | **Must have**<br>same number for whole section and outer skin | |
| MMO collection 1 | **mp 2** | shows at least <u>once</u><br>on raw data <u>mm</u> | **AND** either whole number mm or to 0.5 mm; |
| ACE interpretation 1 | **mp 3** | *from a calculation* the answer is shown as larger whole number to smaller whole number; | |
| | | | **Do not give mark if**<br>• units in ratio<br>• if not to smallest common denominator |

| **(b) (ii)** | | | [1] |
|---|---|---|---|
| ACE interpretation 1 | | +/- smallest division | **AND** <u>mm</u> ; |

© University of Cambridge International Examinations 2012

**2 (c)** [4]

*If line graph drawn only first mp can be given*

| | | | |
|---|---|---|---|
| PDO layout 4 | **mp 1** | *x*-axis<br>component | **AND** *y*-axis<br>percentage or % mass; |
| | **mp 2** | scale as *x*-axis<br>even bar widths up to 15 mm | **AND** *y*-axis<br>5 to 2 cm and **must** start at 0 and label each 2 cm ; |
| | **mp 3** | correct plotting of each bar in the order in the table with a horizontal line<br>• ruled<br>• smooth line less than 1 mm; | |
| | **mp 4** | bars – must be arranged as pairs of each component, but each pair must have a space between<br>quality – all bar vertical lines drawn including on axis if used<br>• ruled<br>• smooth line less than 1 mm<br>• meet horizontal line exactly | **AND**<br>labelled<br>• any clear labels;<br>e.g. **must be** directly below correct bar or inside bar or shaded with key |
| | | | **Do not give mark if**<br>• horizontal line is extended beyond vertical lines<br>• solid shading or line shading outside a bar |

**(d)** [4]

| | | |
|---|---|---|
| MMO collection 1 | **mp 1** | (plantain) 32.00 and (sweet banana) 24.00<br>**or** (plantain) 68.00 and (sweet banana) 76.00; |
| PDO display 2 | **mp 2** | shows addition of values; e.g. plantain 0.50 + 28.00 + 1.50 + 2.00 and sweet banana 0.25 + 19.50 + 1.75 + 2.50<br>**or**<br>shows subtraction of each component from 100; |
| | **mp 3** | shows subtraction to get difference of 32.00 – 24.00<br>**or** (100 -32.00) – (100-24.00)<br>**or** 76.00 – 68.00; |
| ACE interpretation 1 | **mp 4** | 8.00; |

**[Total: 18]**

© University of Cambridge International Examinations 2012