UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS **GCE Ordinary Level** 

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## for the guidance of teachers

## **5090 BIOLOGY**

5090/32

Paper 3 (Practical Test), 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.

| Initial height       height of dough / mm         Initial height       Image: State Sta | <u> </u>  |   | neme: Teachers' version Syllabus   |                         | S. Y               |                                    |
|---|---|---|--|-------------------------|--------------------|------------------------------------|
| change in height         1 - initial two readings - should be similar (within 5 mm)         1 - for final two readings;         1 - change according to figures given;         1 - change in height - positive(+) to be given in S1.         (i) S1 increased more / S2 very little change;<br>Credit for use of figures;<br>shows bubbles / gas / froth in S1 (on the surface of dough) or converse in S2; meniscus<br>[max 3]         (ii) aerobic / anaerobic;<br>respiration;<br>release of carbon dioxide / gas;<br>trapped inside the dough causing it to rise;<br>more S1 / ORA;       [max 3]         same dough mixture;<br>at least three of temperatures within acceptable range;<br>incubate the yeast mixture at set temperature;<br>measure height (by levelling top of mixture); compare;<br>repeat to increase reliability;<br>control without yeast;<br>calculate mean;       [max 3]         Drawing - clear outline of leaflets (minimum of three) attached to a branch (no shading);<br>proportion - minimum of 7 cm;<br>lamina (midrib double line )+ petiole; serrated margin;       [max 3]         Labels - lamina / blade; midrib / veins,<br>petiole / leaf stalk; bud / stipule at base       [max 3]         Photosynthesis;<br>Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;<br>(Green) (horophyll plus ref to gaseous exchange / diffusion / light;<br>Leaf with large surface area plus ref to gas exchange / light;<br>Attachment - transport (if correct) to stem / veins.       [max 3]  |   | GCE O I   | LEVEL – May/June   | 2012                    | 5090               | Pac                                |
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| change in height         1 - initial two readings - should be similar (within 5 mm)         1 - for final two readings;         1 - change according to figures given;         1 - change in height - positive(+) to be given in S1.         (i) S1 increased more / S2 very little change;<br>Credit for use of figures;<br>shows bubbles / gas / froth in S1 (on the surface of dough) or converse in S2; meniscus<br>[max 3]         (ii) aerobic / anaerobic;<br>respiration;<br>release of carbon dioxide / gas;<br>trapped inside the dough causing it to rise;<br>more S1 / ORA;       [max 3]         same dough mixture;<br>at least three of temperatures within acceptable range;<br>incubate the yeast mixture at set temperature;<br>measure height (by levelling top of mixture); compare;<br>repeat to increase reliability;<br>control without yeast;<br>calculate mean;       [max 3]         Drawing - clear outline of leaflets (minimum of three) attached to a branch (no shading);<br>proportion - minimum of 7 cm;<br>lamina (midrib double line )+ petiole; serrated margin;       [max 3]         Labels - lamina / blade; midrib / veins,<br>petiole / leaf stalk; bud / stipule at base       [max 3]         Photosynthesis;<br>Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;<br>(Green) (horophyll plus ref to gaseous exchange / diffusion / light;<br>Leaf with large surface area plus ref to gas exchange / light;<br>Attachment - transport (if correct) to stem / veins.       [max 3]  |   |   | S1   | S2                      |                    |                                    |
| change in height         1 - initial two readings - should be similar (within 5 mm)         1 - for final two readings;         1 - change according to figures given;         1 - change in height - positive(+) to be given in S1.         (i) S1 increased more / S2 very little change;<br>Credit for use of figures;<br>shows bubbles / gas / froth in S1 (on the surface of dough) or converse in S2; meniscus<br>[max 3]         (ii) aerobic / anaerobic;<br>respiration;<br>release of carbon dioxide / gas;<br>trapped inside the dough causing it to rise;<br>more S1 / ORA;       [max 3]         same dough mixture;<br>at least three of temperatures within acceptable range;<br>incubate the yeast mixture at set temperature;<br>measure height (by levelling top of mixture); compare;<br>repeat to increase reliability;<br>control without yeast;<br>calculate mean;       [max 3]         Drawing - clear outline of leaflets (minimum of three) attached to a branch (no shading);<br>proportion - minimum of 7 cm;<br>lamina (midrib double line )+ petiole; serrated margin;       [max 3]         Labels - lamina / blade; midrib / veins,<br>petiole / leaf stalk; bud / stipule at base       [max 3]         Photosynthesis;<br>Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;<br>(Green) (horophyll plus ref to gaseous exchange / diffusion / light;<br>Leaf with large surface area plus ref to gas exchange / light;<br>Attachment - transport (if correct) to stem / veins.       [max 3]  | initial h   | eight   |  |                         |                    |                                    |
| <ul> <li>1 - initial two readings - should be similar (within 5 mm)</li> <li>1 - for final two readings;</li> <li>1 - change according to figures given;</li> <li>1 - change in height - positive(+) to be given in S1.</li> <li>(i) S1 increased more / S2 very little change;<br/>Credit for use of figures;<br/>shows bubbles / gas / froth in S1 (on the surface of dough) or converse in S2; meniscus [max 3]</li> <li>(ii) aerobic / anaerobic;<br/>respiration;<br/>release of carbon dioxide / gas;<br/>trapped inside the dough causing it to rise;<br/>more S1 / ORA;</li> <li>(max 3]</li> <li>same dough mixture;<br/>at least three of temperatures within acceptable range;<br/>incubate the yeast mixture at set temperature;<br/>measure height (by levelling top of mixture); compare;<br/>repeat to increase reliability;<br/>control without yeast;<br/>calculate mean;</li> <li>[max 3]</li> <li>Drawing - clear outline of leaflets (minimum of three) attached to a branch (no shading);<br/>proportion - minimum of 7 cm;<br/>lamina (midrib double line) + petiole; serrated margin;</li> <li>[max 3]</li> <li>Photosynthesis;<br/>Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;<br/>(Green) chlorophyll plus ref to gaseous exchange / diffusion / light penetration;<br/>(Green) chlorophyll plus ref to gaseous exchange / diffusion / light;<br/>Attachment - transport (if correct) to stem / veins.</li> </ul>   | final he  | ight after 30 mins  |  |                         |                    |                                    |
| <ul> <li>1 - for final two readings;</li> <li>1 - change according to figures given;</li> <li>1 - change in height – positive(+) to be given in S1.</li> <li>(i) S1 increased more / S2 very little change;<br/>Credit for use of figures;<br/>shows bubbles / gas / froth in S1 (on the surface of dough) or converse in S2; meniscus<br/>[max 3]</li> <li>(ii) aerobic / anaerobic;<br/>respiration;<br/>release of carbon dioxide / gas;<br/>trapped inside the dough causing it to rise;<br/>more S1 / ORA;</li> <li>[max 3]</li> <li>same dough mixture;<br/>at least three of temperatures within acceptable range;<br/>incubate the yeast mixture at set temperature;<br/>measure height (by levelling top of mixture); compare;<br/>repeat to increase reliability;<br/>control without yeast;<br/>calculate mean;</li> <li>[max 4]</li> <li>Drawing - clear outline of leaflets (minimum of three) attached to a branch (no shading);<br/>proportion - minimum of 7 cm;<br/>lamina (midrib double line) + petiole; serrated margin;</li> <li>[max 4]</li> <li>Photosynthesis;</li> <li>Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;<br/>(Green ) chlorophyll plus ref to gaseous exchange / light;<br/>Attachment - transport (if correct) to stem / veins.</li> <li>[max 5]</li> </ul>  | change  | in height   |  |                         |                    |                                    |
| respiration;         release of carbon dioxide / gas;         trapped inside the dough causing it to rise;         more S1 / ORA;         [max 3]         same dough mixture;         at least three of temperatures within acceptable range;         incubate the yeast mixture at set temperature;         measure height (by levelling top of mixture); compare;         repeat to increase reliability;         control without yeast;         calculate mean;         [Total: 12]         Drawing - clear outline of leaflets (minimum of three) attached to a branch (no shading);         proportion - minimum of 7 cm;         lamina (midrib double line) + petiole; serrated margin;         Labels - lamina / blade; midrib / veins,         petiole / leaf stalk; bud / stipule at base         Photosynthesis;         Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;         (Green) chlorophyll plus ref to absorption of light;         Leaf with large surface area plus ref to gas exchange / light;         Attachment - transport (if correct) to stem / veins.         [max 3]   | 1 – for f<br>1 – chai<br>1 – chai<br>(b) (i) S1<br>Cre    | inal two readings;<br>nge according to fi<br>nge in height – pos<br>increased more /<br>dit for use of figure | igures given;<br>sitive(+) to be given<br><b>S2</b> very little changes; | in S1.<br>ge;           | ugh) or converse   | [4]<br>in S2; meniscus.<br>[max 3] |
| at least three of temperatures within acceptable range;<br>incubate the yeast mixture at set temperature;<br>measure height (by levelling top of mixture); compare;<br>repeat to increase reliability;<br>control without yeast;<br>calculate mean; [max 3<br>[Total: 19<br>Drawing – clear outline of leaflets (minimum of three) attached to a branch (no shading);<br>proportion – minimum of 7 cm;<br>lamina (midrib double line )+ petiole; serrated margin; [max 3<br>Labels – lamina / blade; midrib / veins,<br>petiole / leaf stalk; bud / stipule at base [max 3<br>Photosynthesis;<br>Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;<br>(Green) chlorophyll plus ref to absorption of light;<br>Leaf with large surface area plus ref to gas exchange / light;<br>Attachment – transport (if correct) to stem / veins. [max 3]   | res<br>rele<br>trap                                       | <u>piration;</u><br>ase of carbon dio<br>ped inside the do  |  | e;                      |                    | [max 3]                            |
| Drawing – clear outline of leaflets (minimum of three) attached to a branch (no shading);<br>proportion – minimum of 7 cm;<br>lamina (midrib double line )+ petiole; serrated margin; [max 2<br>Labels – lamina / blade; midrib / veins,<br>petiole / leaf stalk; bud / stipule at base [max 2<br>Photosynthesis;<br>Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;<br>(Green) chlorophyll plus ref to absorption of light;<br>Leaf with large surface area plus ref to gas exchange / light;<br>Attachment – transport (if correct) to stem / veins. [max 2  | at least<br>incubate<br>measure<br>repeat to<br>control v | three of temperature<br>the yeast mixture<br>height (by levelli<br>o increase reliabili<br>without yeast;     | e at set temperature<br>ng top of mixture); o                            | ;                       |                    | [max 5]                            |
| proportion – minimum of 7 cm;       [max 3]         lamina (midrib double line )+ petiole; serrated margin;       [max 3]         Labels – lamina / blade; midrib / veins,       [max 3]         petiole / leaf stalk; bud / stipule at base       [max 3]         Photosynthesis;       [max 4]         Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;       (Green) chlorophyll plus ref to absorption of light;         Leaf with large surface area plus ref to gas exchange / light;       Attachment – transport (if correct) to stem / veins.       [max 3]  |   |   |  |                         |                    | [Total: 15]                        |
| petiole / leaf stalk; bud / stipule at base[max 2Photosynthesis;<br>Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;<br>(Green) chlorophyll plus ref to absorption of light;<br>Leaf with large surface area plus ref to gas exchange / light;<br>Attachment – transport (if correct) to stem / veins.[max 2  | proporti<br>lamina (                                      | on – minimum of 7<br>midrib double line   | <sup>7</sup> cm;<br>)+ petiole; serrated                                 |                         | hed to a branch (  | no shading);<br>[max 3]            |
| Flat / thin leaf plus ref to gaseous exchange / diffusion / light penetration;<br>(Green) chlorophyll plus ref to absorption of light;<br>Leaf with large surface area plus ref to gas exchange / light;<br>Attachment – transport (if correct) to stem / veins. [max 3   |   |   |  |                         |                    | [max 2]                            |
| Poteronee to the loof eleging around an ever insect / loof meaning forming them / refts resident  | Flat / thi<br>(Green)<br>Leaf wit                         | n leaf plus ref to g<br>chlorophyll plus re<br>h large surface are  | ef to absorption of li<br>ea plus ref to gas ex                          | ght;<br>kchange / light | •                  | [max 3]                            |
| Reference to the leaf closing around or over insect / leaf margins forming trap / ref to pointed  | (c) Referen   | ce to the leaf clos   | ing around or over i   | nsect / leaf ma         | argins formina tra | p / ref to pointed                 |

structures

[1]

|                 |  |   | Mary .  |
|-----------------|--|---|---|
| Page 3          |  | Mark Scheme: Teachers' version  | Syllabus r                                      |
| <b>v</b>        |  | GCE O LEVEL – May/June 2012   | 5090  |
| (d) (i)<br>(ii) | Not                                    | ate / nitrogen containing compound / phosphate;<br>nitrogen alone<br>ymes / proteins / nucleic acids / DNA / cell membrar   | Syllabus<br>5090<br>ne / forms new protoplasm / |
| 3 (a) (i)       | Ū                                      | vth / chlorophyll;<br>nen / anther / pollen sac correctly named / indicated   | [ <sup>1</sup> ]<br>[Total: 11]                 |
| (~) (!)         | e tain                                 |   | . [·]   |
| (ii)            | Stigr                                  | ma / stigmatic surface correctly identified / named   | [1]   |
| (b) (i)         | Add<br>glove<br>Expe<br>A – I<br>R – I | pare solution / tissue / cut up / grind in water;<br>Benedict's solution; heat; one safety feature e.g. in<br>es / lab coat;<br>ected colour change if positive;<br>brown qualified e.g. reddish (for orange).<br>incorrect colour change<br>use of clinistix – max 3 marks | water bath / use of tongs /<br>[max 4]          |
| (ii)            | Gree                                   | en / yellow / red;  | [1]   |

| time / hours | length / mm |  |
|--------------|-------------|--|
| 0.0          | (0)         |  |
| 2.0          | 18 – 20     |  |
| 4.0          | 23 – 25     |  |
| 6.0          | 28 – 30     |  |
| 8.0          | 34 – 36     |  |
| 10.0         | 41 – 43     |  |

A – ranges shown but units not required.

A - 2 marks for no errors

A - 1 mark for one error

- (ii) Orientation of axes with time (t) on X axis & length on Y axis; Clear plots to cover at least half of the grid and with zero indicated; Neat line drawn (connections ruled / line of best fit).
   [3]
- (iii) Growth faster in first 2 hours (at first) then becoming slower / constant; [1]
- (d) Towards chemical / hormone (in ovule);

[Total: 14]

[1]

[2]