

**MARK SCHEME for the October/November 2010 question paper  
for the guidance of teachers**

**0610 BIOLOGY**

**0610/62**

Paper 6 (Alternative to Practical), 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.

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

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| <b>Questions</b>                        | <b>Mark Scheme</b>                                                                                                                                                       | <b>Guidance/comments</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |       |        |       |                 |   |   |          |                 |       |       |              |                          |                                    |                                  |                             |                           |             |            |                    |                                         |         |            |                           |                        |      |            |         |                              |                                    |             |                  |
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| <b>1 (a)</b>                            | unripe fruit – smaller / seeds white<br>freshly harvested – larger / seeds getting darker<br>stored,<br>ripe fruit – wrinkled /darker in skin colour/ seeds<br>darker;;; | <table border="1"> <thead> <tr> <th></th> <th>small</th> <th>middle</th> <th>large</th> </tr> </thead> <tbody> <tr> <td>number of seeds</td> <td>1</td> <td>1</td> <td>3 / more</td> </tr> <tr> <td>colour of seeds</td> <td>white</td> <td>white</td> <td>dark / black</td> </tr> <tr> <td>size of seeds / maturity</td> <td>small / immature / under-developed</td> <td>larger / more mature / developed</td> <td>larger / mature / developed</td> </tr> <tr> <td>core / middle region / aw</td> <td>undeveloped</td> <td>developing</td> <td>developed / larger</td> </tr> <tr> <td>sepal / stigma / style / flower remains</td> <td>present</td> <td>less clear</td> <td>smaller / shrivelled / aw</td> </tr> <tr> <td>fleshy wall / mesocarp</td> <td>thin</td> <td>developing</td> <td>thicker</td> </tr> <tr> <td>skin / epicarp / outer layer</td> <td>outer covering of young fruit / aw</td> <td>thin / pale</td> <td>thicker / darker</td> </tr> </tbody> </table> <p>I. ref to petals/anthers</p> <p><b>A.</b> relevant comment not linked to a particular stage.</p> <p>I. comments on roots / leaves / stalk / cell wall.<br/>I. seeds – growing as confused with germination.<br/>I. comment on size of apple as instructed in question.</p> |                             | small | middle | large | number of seeds | 1 | 1 | 3 / more | colour of seeds | white | white | dark / black | size of seeds / maturity | small / immature / under-developed | larger / more mature / developed | larger / mature / developed | core / middle region / aw | undeveloped | developing | developed / larger | sepal / stigma / style / flower remains | present | less clear | smaller / shrivelled / aw | fleshy wall / mesocarp | thin | developing | thicker | skin / epicarp / outer layer | outer covering of young fruit / aw | thin / pale | thicker / darker |
|                                         | small                                                                                                                                                                    | middle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | large                       |       |        |       |                 |   |   |          |                 |       |       |              |                          |                                    |                                  |                             |                           |             |            |                    |                                         |         |            |                           |                        |      |            |         |                              |                                    |             |                  |
| number of seeds                         | 1                                                                                                                                                                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3 / more                    |       |        |       |                 |   |   |          |                 |       |       |              |                          |                                    |                                  |                             |                           |             |            |                    |                                         |         |            |                           |                        |      |            |         |                              |                                    |             |                  |
| colour of seeds                         | white                                                                                                                                                                    | white                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | dark / black                |       |        |       |                 |   |   |          |                 |       |       |              |                          |                                    |                                  |                             |                           |             |            |                    |                                         |         |            |                           |                        |      |            |         |                              |                                    |             |                  |
| size of seeds / maturity                | small / immature / under-developed                                                                                                                                       | larger / more mature / developed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | larger / mature / developed |       |        |       |                 |   |   |          |                 |       |       |              |                          |                                    |                                  |                             |                           |             |            |                    |                                         |         |            |                           |                        |      |            |         |                              |                                    |             |                  |
| core / middle region / aw               | undeveloped                                                                                                                                                              | developing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | developed / larger          |       |        |       |                 |   |   |          |                 |       |       |              |                          |                                    |                                  |                             |                           |             |            |                    |                                         |         |            |                           |                        |      |            |         |                              |                                    |             |                  |
| sepal / stigma / style / flower remains | present                                                                                                                                                                  | less clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | smaller / shrivelled / aw   |       |        |       |                 |   |   |          |                 |       |       |              |                          |                                    |                                  |                             |                           |             |            |                    |                                         |         |            |                           |                        |      |            |         |                              |                                    |             |                  |
| fleshy wall / mesocarp                  | thin                                                                                                                                                                     | developing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | thicker                     |       |        |       |                 |   |   |          |                 |       |       |              |                          |                                    |                                  |                             |                           |             |            |                    |                                         |         |            |                           |                        |      |            |         |                              |                                    |             |                  |
| skin / epicarp / outer layer            | outer covering of young fruit / aw                                                                                                                                       | thin / pale                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | thicker / darker            |       |        |       |                 |   |   |          |                 |       |       |              |                          |                                    |                                  |                             |                           |             |            |                    |                                         |         |            |                           |                        |      |            |         |                              |                                    |             |                  |
|                                         |                                                                                                                                                                          | [max 3]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                             |       |        |       |                 |   |   |          |                 |       |       |              |                          |                                    |                                  |                             |                           |             |            |                    |                                         |         |            |                           |                        |      |            |         |                              |                                    |             |                  |

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| <p><b>(b)</b></p>     | <p><b>one safety feature</b> – max;</p> <p>starch iodine solution;<br/>black if starch present;</p> <p>reducing sugar make solution / AW;<br/>add Benedict's solution;<br/>heat;<br/>green / yellow / orange / red; [int max 3]</p>                 | <p>[max 5]</p> | <p>Water bath / tongs / lab coat / hair tied back.<br/>I. gloves.<br/>A. drops of iodine / iodine in KI.<br/>A. black / purple / blue I. heating / ethanol.</p> <p>A. make an extract / chopping up and adding water / AW<br/>A. Fehlings / Clinistix.<br/>I. warm<br/>Must match reagent used. Clinistix purple / dark blue for positive.<br/>I. brown alone. A. red / reddish brown. I. use of ethanol.<br/>If used biuret reagent – do not award marks for reducing sugar.</p>                                                                                                                                                                     |       |            |                                                                                    |
| <p><b>(c) (i)</b></p> | <table border="1"> <tr><td>66.3</td></tr> <tr><td>93.5</td></tr> <tr><td>109.5</td></tr> </table>                                                                                                                                                   | 66.3           | 93.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 109.5 | <p>[1]</p> | <p>All correct = 1</p> <p>If 30.5 / 27.2 / 16.0 – no mark but e.c.f. for plot.</p> |
| 66.3                  |                                                                                                                                                                                                                                                     |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |            |                                                                                    |
| 93.5                  |                                                                                                                                                                                                                                                     |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |            |                                                                                    |
| 109.5                 |                                                                                                                                                                                                                                                     |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |            |                                                                                    |
| <p><b>(ii)</b></p>    | <p><b>A</b> – axes and labels and orientation;</p> <p><b>S</b> – scale – suitable to fill more than half the grid and even;</p> <p><b>P</b> – plot;</p> <p><b>L</b> – line;</p> <p>Score marks by a series of <math>\surd</math> or X in order.</p> | <p>[4]</p>     | <p>x-axis – time in days and y-axis – loss in mass (of apples ) / g<br/>If plot mass – 2nd column in error Allow S and L 2 MAX.</p> <p>Non-linear scale A only.</p> <p>Allow +/- half a small square. Must plot zero.<br/>For those who plot only the last 3 values:<br/>Allow A, S and L = 3 max.</p> <p>Allow line of best fit – if correct and balanced plots each side of the line. Allow a smooth curve but not if 'sagging' and too thick to identify points.<br/>Allow points joined by ruled lines. No extrapolation.<br/>Histograms / bar charts allow A, P and neatness = 3 max. Allow label for columns in the middle not to one side.</p> |       |            |                                                                                    |

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| <b>(iii)</b> | respiration / fermentation / oxidation;<br>transpiration / evaporation / dehydration / water loss / drying;<br>decomposition / decay / action of microbes / rotting / AW;                                                                                                                                                    | [max 2]            | Allow aerobic and anaerobic respiration. <b>A.</b> excretion of CO <sub>2</sub><br><b>I.</b> reduction / metabolic reactions/ / hydrolysis.<br><br><b>I.</b> eating / osmosis.                                                                                    |
| <b>(iv)</b>  | 1. keep in cooler conditions / in a fridge / not too hot / AW ;<br>2. cover apples / wrap apples;<br>3. keep in the dark or out of sunlight;<br>4. under different gases / nitrogen / carbon dioxide/ less oxygen / air tight / vacuum;<br>5. keep separated / cushioned / AW;<br>6. keep away / separated from ripe fruits; | [max 3]            | <b>R.</b> freezer<br><br><b>R.</b> use of plastic bags / cellophane / clingfilm. <b>A.</b> paper / foil.<br><br>Idea to prevent bruising.<br><b>I.</b> moist or dry conditions / well ventilated / wash and disinfect / pesticides / preservative / antioxidants. |
|              |                                                                                                                                                                                                                                                                                                                              | <b>[Total: 18]</b> |                                                                                                                                                                                                                                                                   |

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| 2 (a)              | drawing: <b>O</b> clear outline and no heavy shading;<br><b>S</b> equal size but not smaller than 6 cm;<br><b>D</b> both valves and hinge;<br><b>ONE</b> label: hinge / joint / ligament / shell / exoskeleton / muscle attachment / AW; | [4]     | Allow stippling but not blocked in shading<br><br><b>I.</b> thick wall / covering / coat / epidermis / testa / outer layer.<br>Score marks by a series of ✓ or X in order for drawing but tick by correct / accepted label.                                                                                    |
| (b)                | protective / camouflage / shelter / safety /hide;<br>hard / tough/ rigid / thick / heavy;<br>from predators / being eaten / attacked / prevent drying out / pressure or waves or depth of water / current;                               | [max 2] | <b>A.</b> if this is implied                                                                                                                                                                                                                                                                                   |
| (c) (i)            | <u>mollusc</u> ;                                                                                                                                                                                                                         | [1]     | <b>A.</b> close spelling                                                                                                                                                                                                                                                                                       |
| (ii)               | size in Fig. 2.2 .....38...(mm); <i>NB length</i> .<br><br>scale is 3 mm = 25 mm – part of working;<br>actual size = $\frac{38 \times 3}{25} = 4.56$ mm or 0.456 cm;<br><br>4.6                                                          | [3]     | <b>A.</b> +/- 1 mm for length 37 – 41 mm<br>From diagram check if width has been measured in error. ecf.<br><br>Accept correct word formula = one mark<br><br>Accept actual size in range of 4.4 – 4.8 mm<br>Allow correct measurement in cm.<br>If correct answer – but no working shown $\sqrt{\sqrt{}} = 2$ |
| <b>[Total: 10]</b> |                                                                                                                                                                                                                                          |         |                                                                                                                                                                                                                                                                                                                |

|       |                                                                                                                                                                                                                                                                                                                                                    |                                                               |                                  |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                            |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 (a) | feature                                                                                                                                                                                                                                                                                                                                            | submerged leaves                                              | floating leaves                  | [max 2]                                                                                                                                                                                                                                                | <p>Descriptions appear either in table form or all text and run together – dredge.<br/>They / it = submerged leaves.<br/>I. reference to flowers.<br/>Answer does not have to be comparative. <b>A.</b> description of one type of leaf.</p> <p>Award correct biology.</p> |
|       | shape                                                                                                                                                                                                                                                                                                                                              | thin / narrow / elongated / divided / branched / ORA          | broad / entire / undivided / ORA |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                            |
|       | surface area                                                                                                                                                                                                                                                                                                                                       | small                                                         | large                            |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                            |
|       | number                                                                                                                                                                                                                                                                                                                                             | 2 / less / fewer                                              | 3 / more                         |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                            |
|       | leaf stalk / petiole                                                                                                                                                                                                                                                                                                                               | not present / leaf attached                                   | present / long                   |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                            |
|       | veins                                                                                                                                                                                                                                                                                                                                              | none / not visible                                            | present / network                |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                            |
|       | (b) (i)                                                                                                                                                                                                                                                                                                                                            | palisade mesophyll; spongy mesophyll; label lines or brackets |                                  |                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                            |
| (ii)  | <p>palisade mesophyll: more light/ more or lots of chloroplasts / more chlorophyll; arrangement of cells near upper surface; photosynthesis;</p> <p>spongy mesophyll : air spaces / air gaps; less light/ less chloroplasts / less chlorophyll; photosynthesis: gas / CO<sub>2</sub> / water vapour / oxygen / air circulation / gas exchange;</p> |                                                               | [max 3]                          | <p><b>A.</b> 'middle tissue' as spongy mesophyll. Photosynthesis only once<br/>Not separated by naming the tissue – then <b>A.</b> correct references to photosynthesis / gas exchange / air spaces for MAX 2<br/>I. reference to vascular tissue.</p> |                                                                                                                                                                                                                                                                            |

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| <b>(c)</b>         | <p>animal tube:<br/>         colour – <u>yellow</u>;<br/>         explanation – giving off / producing / releasing CO<sub>2</sub> /<br/>         high CO<sub>2</sub> / carbonic acid;<br/>         from respiration;</p> <p>waterweed tube:<br/>         colour – <u>purple</u>;<br/>         explanation – low CO<sub>2</sub> / CO<sub>2</sub> used up / taken in / AW;<br/>         by photosynthesis;</p> |         | <p>Read the whole answer – the colour may change during the answer to final colour at the end of account.<br/>         Independent marking.<br/>         I. becomes acid.<br/>         I. any references to oxygen. I. references to breathing.</p> <p>Not red for colour but allow explanation if ref to photosynthesis.<br/>         I. any references to oxygen and change in pH / becomes alkaline.</p> |
|                    |                                                                                                                                                                                                                                                                                                                                                                                                              | [max 5] |                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>[Total: 12]</b> |                                                                                                                                                                                                                                                                                                                                                                                                              |         |                                                                                                                                                                                                                                                                                                                                                                                                             |