

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the March 2016 series

0610 BIOLOGY

0610/52

Paper 5 (Practical Test), maximum raw mark 40

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Abbreviations used in the Mark Scheme

- ; separates marking points
- / alternatives
- I ignore
- R reject
- A accept (for answers correctly cued by the question, or guidance for examiners)
- AW alternative wording (where responses vary more than usual)
- AVP any valid point
- ecf credit a correct statement / calculation that follows a previous wrong response
- **ora** or reverse argument
- () the word / phrase in brackets is not required, but sets the context
- underline actual word given must be used by candidate (grammatical variants excepted)
- max indicates the maximum number of marks that can be given

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| Question | Mark scheme | Mark | Guidance |
|----------|---|---------|---|
| 1 (a) | change to blue-black | [1] | |
| (b) | <p>1 one table with ruled lines for at least 6 rows and 3 columns ;</p> <p>2 a column/row, with header: time/min ;</p> <p>3 two, columns/rows headings as, colour/observation, W/C ;</p> <p>4 correct completion of information into table ;</p> <p>5 W – start is blue-black, gradual change through dark brown to orange-brown ;</p> <p>6 C – start is blue-black, remains blue-black for longer than W, may turn brown towards the end ;</p> | [6] | <p>R units in any data cell/m for min</p> <p>R if colour and letter not both a 'header'</p> |
| (c) | <i>idea of</i> minimising contamination ; to measure simultaneously ; | [max 1] | |
| (d) | (blue-black shows) starch present at, 0 min/start ; (dark brown shows) some starch present at 2 min ; (orange-brown shows) no starch present, after 2 min/from 4 min ; | [3] | |
| (e) | <p>yes : C stayed blue-black for longer/slower colour change ora ;</p> <p>OR</p> <p>no : there is not a large enough range of temperatures ;</p> | [max 1] | |

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| Question | Mark scheme | Mark | Guidance | | | | | | | | | | | | | | | | | | |
|--|---|-----------------|-------------|---------------------------------|---|---|---|--|--|---|---|---|---|--|---|-------------------------------|---|---|---|---------|--|
| (f) | <p>any two errors with two matching improvements:</p> <table border="1"> <thead> <tr> <th>Source of error</th> <th>Improvement</th> </tr> </thead> <tbody> <tr> <td>experiment was done only once ;</td> <td>repeat entire experiment (at least 3 times in total) to calculate an average;</td> </tr> <tr> <td>shaking, can cause spillage / inconsistent mixing ;</td> <td>(magnetic) stirrer / glass rod bung / flask to swirl;</td> </tr> <tr> <td>drops / dropping pipettes, are imprecise / volume of amylase may not be the same ;</td> <td>use syringe / burette / graduated pipette / measuring cylinder ; Accept method without equipment</td> </tr> <tr> <td>(long) intervals between testing / AW ; A reaction finishes between points</td> <td>test, more often / every minute / 30 seconds;</td> </tr> <tr> <td>colour changes are subjective ; A endpoint hard to judge</td> <td>colour chart / standards / control with no starch / colorimeter ;</td> </tr> <tr> <td>trying to do, W and C simultaneously ;</td> <td>do W and C separately / second person to do second tube ;</td> </tr> <tr> <td>(water) temperature changes ;</td> <td>insulate beakers / use (thermostatically controlled) water bath ;</td> </tr> <tr> <td>AVP ; e.g. contents in pipette might contaminate spotting tests</td> <td>AVP ; e.g. use clean pipettes each time</td> </tr> </tbody> </table> | Source of error | Improvement | experiment was done only once ; | repeat entire experiment (at least 3 times in total) to calculate an average; | shaking, can cause spillage / inconsistent mixing ; | (magnetic) stirrer / glass rod bung / flask to swirl; | drops / dropping pipettes, are imprecise / volume of amylase may not be the same ; | use syringe / burette / graduated pipette / measuring cylinder ; Accept method without equipment | (long) intervals between testing / AW ; A reaction finishes between points | test, more often / every minute / 30 seconds; | colour changes are subjective ; A endpoint hard to judge | colour chart / standards / control with no starch / colorimeter ; | trying to do, W and C simultaneously ; | do W and C separately / second person to do second tube ; | (water) temperature changes ; | insulate beakers / use (thermostatically controlled) water bath ; | AVP ; e.g. contents in pipette might contaminate spotting tests | AVP ; e.g. use clean pipettes each time | [max 4] | R improvement if it contradicts error |
| Source of error | Improvement | | | | | | | | | | | | | | | | | | | | |
| experiment was done only once ; | repeat entire experiment (at least 3 times in total) to calculate an average; | | | | | | | | | | | | | | | | | | | | |
| shaking, can cause spillage / inconsistent mixing ; | (magnetic) stirrer / glass rod bung / flask to swirl; | | | | | | | | | | | | | | | | | | | | |
| drops / dropping pipettes, are imprecise / volume of amylase may not be the same ; | use syringe / burette / graduated pipette / measuring cylinder ; Accept method without equipment | | | | | | | | | | | | | | | | | | | | |
| (long) intervals between testing / AW ; A reaction finishes between points | test, more often / every minute / 30 seconds; | | | | | | | | | | | | | | | | | | | | |
| colour changes are subjective ; A endpoint hard to judge | colour chart / standards / control with no starch / colorimeter ; | | | | | | | | | | | | | | | | | | | | |
| trying to do, W and C simultaneously ; | do W and C separately / second person to do second tube ; | | | | | | | | | | | | | | | | | | | | |
| (water) temperature changes ; | insulate beakers / use (thermostatically controlled) water bath ; | | | | | | | | | | | | | | | | | | | | |
| AVP ; e.g. contents in pipette might contaminate spotting tests | AVP ; e.g. use clean pipettes each time | | | | | | | | | | | | | | | | | | | | |

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| Question | Mark scheme | Mark | Guidance |
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| (g) | <p>1 test at 40 °C ;</p> <p>2 test at least one temperature below 40 °C <u>and</u> one above ;</p> <p>3 use of water bath (to maintain different temperatures)/AW ;</p> <p>4&5 named controlled variables ; ;</p> <p>6 measure time taken until iodine becomes orange brown / no longer changes colour ;</p> <p>7 by repeated sampling at interval of less than 2 mins ;</p> <p>8 repeat entire experiment / replicates ;</p> <p>9 relevant stated safety procedure ;</p> | [max 6] | <p>Units must be stated correctly once</p> <p>4&5 – e.g. equilibration time ; pH ; volume / concentration, iodine / amylase / starch ; I amount / quantity</p> <p>I regular</p> |
| (h) | Benedict's solution turns (brick) red ; with heat ; | [2] | A green / yellow / orange for red |
| | | [Total: 24] | |
| 2 (a) (i) | <p>A axes labelled with units, in correct orientation ;</p> <p>S linear scale for plotted points to half or more in both dimensions ;</p> <p>P all plotted points accurate to \pm half small square ;</p> <p>L smoothed line passing through all points ;</p> <p>L line with no extrapolation ;</p> | [5] | <p>A x: distance / cm y: bubbles per min OR bubbles / min R m for min</p> <p>S origin must be stated at least once</p> <p>P R bar chart / histogram</p> <p>L R feathering / thick line</p> |
| (ii) | line drawn from 6 bubbles to their line, and then to the distance axis ; correct reading from their graph ; | [2] | <p>ecf for wrong trend line in 2(a)(i)</p> <p>R if wrong units</p> |
| (iii) | <p>1 at higher light (intensity) rate of oxygen production is higher ora</p> <p>2 at shorter distance from lamp rate of oxygen production is higher ; ora</p> <p>3 comparative data quote with units stated at least once ;</p> <p>4 <i>idea that</i> there is a non-linear relationship / not (directly) proportional ;</p> | [max 2] | A faster photosynthesis for higher rate of oxygen produced. |

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| (iv) | prevents (lamp) heating up, plant/water ; | [1] | I maintain/control, temperature A stops temperature rise/water absorbs heat/lamp releases heat I cooling |
| (b) (i) | O – clear outline ; S – size larger than Fig. 2.2 ; D – detail (3 or 4 layers shown) proportions must be: thin → thick → medium moving inwards ; | [3] | O – R any cell detail drawn/feathering/shading/ drawn with a compass S – R if smaller than 8 cm diameter |
| (ii) | L – stele labelled and label line touches or enters the stele | [1] | |
| (iii) | 69 ±0.5 (mm) ; (=69/7.5) 9 (times/x) ; | [2] | A 6.9 <u>cm</u> ecf correct calculation to nearest whole number from wrong measurement R if wrong units stated |
| | | [Total: 16] | |