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

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<table>
<tr><th>Question</th><th>Mark scheme</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>(f)</td><td>any two errors with two matching improvements:
<table>
<tr><th>Source of error</th><th>Improvement</th></tr>
<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>
</table></td><td>[max 4]</td><td>R improvement if it contradicts error</td></tr>
</table>

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

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| Question | Mark scheme | Mark | Guidance |
|---|---|---|---|
| (iv) | prevents (lamp) heating up, plant / water ; | [1] | **I** maintain / control, temperature<br>**A** stops temperature rise / water absorbs heat / lamp releases heat<br>**I** cooling |
| (b) (i) | **O** – clear outline ;<br>**S** – size larger than Fig. 2.2 ;<br>**D** – detail (3 or 4 layers shown)<br>proportions must be: thin → thick → medium<br>moving inwards ; | [3] | **O – R** any cell detail drawn / feathering / shading / drawn with a compass<br>**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) ;<br>(=69 / 7.5)<br>9 (times / x) ; | [2] | **A** 6.9 cm<br>**ecf** correct calculation to nearest whole number from wrong measurement<br>**R** if wrong units stated |
| | | **[Total: 16]** | |

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