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# Mark Scheme (Results)

## Summer 2013

## International GCSE
## Biology (4BI0) Paper 2BR

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| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 1 (a) | species from different area / another country / foreign / non-native / new / moves in / eq;<br>compete / replace / take over / win / spreads / affect survival / threatens wildlife / eq; | ignore invades / attacks / unwanted / cause harm | 2 |
| (b) | 66.1% / 66.08 / 66.079 / 66.0786 / 66.07865 / 66.078648; | allow one mark for 1,798 and 2,721 in working | 2 |
| (c) | lacks predators / eq;<br>rhizomes / underground stems need to be killed / rhizomes / underground stems hard to remove / eq; | ignore large network of underground stems<br>ignore reference to climate | max 1 |
| (d) | 1 competition for light / blocks light;<br>2 (less) photosynthesis;<br>3 no bare soil / no space to grow;<br>4 (less) germination / eq;<br>5 competition for water / minerals / nutrients; | | max 2 |
| (e) | named pest / aphid / eq;<br>named predator / ladybird / eq; | allow snake eat frogs / eq<br>not just any predator prey relationship<br>eg not birds eating worms<br><br>no credit if organism chosen is not a pest | 2 |

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| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 1 (f) (i) | <u>phloem</u>; | allow phonetic spelling | 1 |
| (ii) | (less) sucrose / carbohydrate / sugar / amino acids;<br>(less) respiration / (less) energy / (less) protein; | ignore nutrients / minerals / glucose | 2 |
| (g) | (no) food chain effect / (no) harm to native species / (no) harm to other plants / other plants not eaten / affect other species / eq; | | 1 |
| | | **Total** | **13** |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 2 (a) | carbohydrate, protein, lipid/fat, vitamins, minerals,<br><br>correct proportion / correct amount / suitable amount / adequate amount / eq; | all 5 named<br>ignore water and fibre<br>(all components) in correct proportion / amount =1<br>eg correct amount of protein = 1 | 2 |
| (b) | 1 low calories / low energy / no carbohydrate / low carbohydrate / eq;<br><br>2 not enough (quality) protein;<br>3 not enough fat/lipid;<br>4 not enough vitamin / lack named vitamin / only vitamin C;<br>5 not enough mineral / lack named mineral / only iron;<br>6 flavours may be E numbers / may not want additives / eq; | | max 2 |
| | | **Total** | **4** |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 3 (a) (i) | flask A 22 and flask B 18 (both temperatures correct) ; | units not required | 1 |
| (ii) | <u>respiration;</u><br>heat released / eq; | allow converse<br>ignore energy / warmth | 2 |
| (b) | kill bacteria / kill microorganisms / remove bacteria / no bacteria / fewer bacteria / sterilise / eq; | ignore other organisms | 1 |
| (c) | oxygen (in) / carbon dioxide (out); | ignore air / gas / gas exchange;<br>reject oxygen out alone / carbon dioxide in alone<br>eg to allow oxygen in and out = 1<br>allow movement of oxygen / carbon dioxide | 1 |
| (d) | mass / number / age / amount (of seeds) / eq; | ignore health / time / outside temperature<br>ignore size | 1 |
| | | **Total** | **6** |

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| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 4 (a) | 37; | units not required | 1 |
| (b) | 1 (further) away from optimum temp;<br>2 low (kinetic) energy / less movement / eq;<br>3 few collisions / enzyme substrate complexes / eq; | allow converse for each marking point | max 2 |
| (c) | 1 denatured;<br>2 active site;<br>3 no longer fit / no longer bind / changes shape / deformed / eq: | ignore enzyme destroyed<br>reject enzyme killed | 2 max |
| (d) | 1 (less) oxygen;<br>2 (less) glucose;<br>3 (less) (aerobic) respiration / anaerobic respiration;<br>4 lactic acid / acidic;<br>5 low pH;<br>6 inhibits enzymes / affect enzymes / eq; | | 4 max |
| | | **Total** | **9** |

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>5 (a)</td><td>
<table>
<tr><th>Stage</th><th>Number</th></tr>
<tr><td>absorption</td><td>8</td></tr>
<tr><td>denitrification</td><td>6 / 7;</td></tr>
<tr><td>nitrogen fixation</td><td>1;</td></tr>
<tr><td>excretion</td><td>3;</td></tr>
<tr><td>decomposition</td><td>2;</td></tr>
</table>
</td><td></td><td>4</td></tr>
<tr><td>(b)</td><td>1 active transport / active uptake;<br>2 low concentration to high concentration / against concentration gradient / eq;<br><br>3 energy / ATP;<br>4 root <u>hair</u> (cell);</td><td>ignore diffusion<br>ignore along concentration gradient</td><td>3 max</td></tr>
<tr><td></td><td></td><td>Total</td><td>7</td></tr>
</table>

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 6 (a) | <table><tr><th>Description of part</th><th>Name</th></tr><tr><td>contains light receptor cells</td><td>retina;</td></tr><tr><td>neurone that sends impulses into the brain</td><td>sensory;</td></tr><tr><td>microscopic gap between neurones</td><td>synapse / synaptic (cleft) / synaptic (gap);</td></tr><tr><td>contains muscle effector cells</td><td>(iris)</td></tr></table> | ignore optic | 3 |

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| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 6 (b) | 1 more convex / fatter / wider / thicker / eq;<br>2 bend light / refract ;<br>3 ciliary muscle / body ;<br>4 contract / shorten / eq;<br>5 <u>suspensory ligaments</u>;<br>6 slacken / less tension / loosen / less taut / eq; | more concave and wide = 0<br>ignore diffract<br><br><br>ignore relax | 4 max |
| | | **Total** | **7** |

| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 7 (a) | less carbon dioxide ( in tube) / carbon dioxide absorbed / eq;<br>photosynthesis;<br>light; | ignore oxygen | 3 |
| (b) | control / show leaf causes change / (valid) comparison / show indicator does not change colour on its own / eq; | nothing happens without a leaf = 1<br>to show light does not cause the change = 1 | 1 |
| (c) | 1 respiration and photosynthesis;<br>2 <u>rate of</u> (photosynthesis) = <u>rate of</u> (respiration);<br>3 less photosynthesis in dim light / eq;<br>4 carbon dioxide level is constant /<br>no net input of carbon dioxide /<br>no net output of carbon dioxide / eq; | rate of photosynthesis is the same as rate of respiration = 2 | max 2 |
| (d) (i) | distance / wattage / any valid method to change LI / more lamps / eq; | no credit for change intensity of light | 1 |
| (ii) | count bubbles;<br>measure volume using syringe / measure volume using measuring cylinder / collect gas using syringe / collect gas using measuring cylinder / eq;<br>time taken for indicator to change colour; | ignore names of gases | max 1 |
| (iii) | repeats / average<br>similar pattern / e<br>not include anomalies / remove anomalies / eq; | | max 2 |
| | | **Total** | **10** |

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| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 8 (a) | both characteristics expressed / both alleles are expressed / influence the phenotype (of the heterozygote) / both shown in phenotype / eq; | reject genes<br>ignore same dominance<br>ignore neither dominates | 1 |
| (b) | Parents $I^A I^O$ $I^B I^O$;<br><br>Gametes $I^A$ $I^O$ $I^B$ $I^O$;<br><br>Offspring $I^A I^O$ $I^B I^O$ $I^A I^B$ $I^O I^O$; | allow if I not shown<br>allow all marks if shown as Punnett square<br><br>transfer error ONLY for gametes mark | 3 |
| | | **Total** | **4** |
| | | **Total for paper** | **60** |

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