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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; 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; rhizomes / underground stems need to be killed / rhizomes / underground stems hard to remove / eq;	ignore large network of underground stems ignore reference to climate	max 1
(d)	1 competition for light / blocks light; 2 (less) photosynthesis; 3 no bare soil / no space to grow; 4 (less) germination / eq; 5 competition for water / minerals / nutrients;		max 2
(e)	named pest / aphid / eq; named predator / ladybird / eq;	allow snake eat frogs / eq not just any predator prey relationship eg not birds eating worms no credit if organism chosen is not a pest	2

Question number	Answer	Notes	Marks
1 (f) (i)	phloem;	allow phonetic spelling	1
(ii)	(less) sucrose / carbohydrate / sugar / amino acids; (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, correct proportion / correct amount / suitable amount / adequate amount / eq;	all 5 named ignore water and fibre (all components) in correct proportion / amount =1 eg correct amount of protein = 1	2
(b)	1 low calories / low energy / no carbohydrate / low carbohydrate / eq; 2 not enough (quality) protein; 3 not enough fat/lipid; 4 not enough vitamin / lack named vitamin / only vitamin C; 5 not enough mineral / lack named mineral / only iron; 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> heat released / eq;	allow converse 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; reject oxygen out alone / carbon dioxide in alone eg to allow oxygen in and out = 1 allow movement of oxygen / carbon dioxide	1
(d)	mass / number / age / amount (of seeds) / eq;	ignore health / time / outside temperature ignore size	1
		Total	**6**

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

3 energy / ATP;
4 root <u>hair</u> (cell);</td><td>ignore diffusion
ignore along concentration gradient</td><td>3 max</td></tr>
<tr><td></td><td></td><td>Total</td><td>7</td></tr>
</table>

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

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

Question number	Answer	Notes	Marks
7 (a)	less carbon dioxide (in tube) / carbon dioxide absorbed / eq; photosynthesis; 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 to show light does not cause the change = 1	1
(c)	1 respiration and photosynthesis; 2 <u>rate of</u> (photosynthesis) = <u>rate of</u> (respiration); 3 less photosynthesis in dim light / eq; 4 carbon dioxide level is constant / no net input of carbon dioxide / 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; measure volume using syringe / measure volume using measuring cylinder / collect gas using syringe / collect gas using measuring cylinder / eq; time taken for indicator to change colour;	ignore names of gases	max 1
(iii)	repeats / average ; similar pattern / eq; not include anomalies / remove anomalies / eq;		max 2
		Total	**10**

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 ignore same dominance ignore neither dominates	1
(b)	Parents $I^A I^O$ $I^B I^O$; Gametes I^A I^O I^B I^O; Offspring I^AI^O I^BI^O I^AI^B I^OI^O;	allow if I not shown allow all marks if shown as Punnett square transfer error ONLY for gametes mark	3
		Total	**4**
		Total for paper	**60**

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