



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 <u>and</u> 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)	<u>phloem</u> ;	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 / <u>anaerobic</u> respiration; 4 lactic acid / acidic; 5 low pH; 6 inhibits enzymes / affect enzymes / eq;		4 max
		Total	9

Question number	Answer	Notes	Marks												
5 (a)	<table border="1" data-bbox="398 368 1279 595"> <thead> <tr> <th data-bbox="398 368 853 408">Stage</th> <th data-bbox="853 368 1279 408">Number</th> </tr> </thead> <tbody> <tr> <td data-bbox="398 408 853 448">absorption</td> <td data-bbox="853 408 1279 448">8</td> </tr> <tr> <td data-bbox="398 448 853 488">denitrification</td> <td data-bbox="853 448 1279 488">6 / 7;</td> </tr> <tr> <td data-bbox="398 488 853 528">nitrogen fixation</td> <td data-bbox="853 488 1279 528">1;</td> </tr> <tr> <td data-bbox="398 528 853 568">excretion</td> <td data-bbox="853 528 1279 568">3;</td> </tr> <tr> <td data-bbox="398 568 853 595">decomposition</td> <td data-bbox="853 568 1279 595">2;</td> </tr> </tbody> </table>	Stage	Number	absorption	8	denitrification	6 / 7;	nitrogen fixation	1;	excretion	3;	decomposition	2;		4
Stage	Number														
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denitrification	6 / 7;														
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(b)	<p>1 active transport / active uptake;</p> <p>2 low concentration to high concentration / against concentration gradient / eq;</p> <p>3 energy / ATP;</p> <p>4 root <u>hair</u> (cell);</p>	ignore diffusion ignore along concentration gradient	3 max												
		Total	7												

Question number	Answer		Notes	Marks										
6 (a)	<table border="1"> <thead> <tr> <th data-bbox="394 276 1115 391">Description of part</th> <th data-bbox="1115 276 1344 391">Name</th> </tr> </thead> <tbody> <tr> <td data-bbox="394 391 1115 505">contains light receptor cells</td> <td data-bbox="1115 391 1344 505"><u>retina</u>;</td> </tr> <tr> <td data-bbox="394 505 1115 620">neurone that sends impulses into the brain</td> <td data-bbox="1115 505 1344 620"><u>sensory</u>;</td> </tr> <tr> <td data-bbox="394 620 1115 802">microscopic gap between neurones</td> <td data-bbox="1115 620 1344 802"><u>synapse / synaptic (cleft) / synaptic (gap)</u>;</td> </tr> <tr> <td data-bbox="394 802 1115 917">contains muscle effector cells</td> <td data-bbox="1115 802 1344 917">(iris)</td> </tr> </tbody> </table>		Description of part	Name	contains light receptor cells	<u>retina</u> ;	neurone that sends impulses into the brain	<u>sensory</u> ;	microscopic gap between neurones	<u>synapse / synaptic (cleft) / synaptic (gap)</u> ;	contains muscle effector cells	(iris)	ignore optic	3
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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 <u>suspensory ligaments</u> ; 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 ignore names of gases	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;		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 $I^A I^O$ $I^B I^O$ $I^A I^B$ $I^O I^O$;	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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