



Mark Scheme (Results)

Summer 2013

International GCSE
Biology (4BI0) Paper 2BR

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk for our BTEC qualifications.

Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

If you have any subject specific questions about this specification that require the help of a subject specialist, you can speak directly to the subject team at Pearson. Their contact details can be found on this link: www.edexcel.com/teachingservices.

You can also use our online Ask the Expert service at www.edexcel.com/ask. You will need an Edexcel username and password to access this service.

Pearson: helping people progress, everywhere

Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2013

Publications Code UG035458

All the material in this publication is copyright

© Pearson Education Ltd 2013

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"> <thead> <tr> <th>Stage</th> <th>Number</th> </tr> </thead> <tbody> <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> </tbody> </table>	Stage	Number	absorption	8	denitrification	6 / 7;	nitrogen fixation	1;	excretion	3;	decomposition	2;		4
Stage	Number														
absorption	8														
denitrification	6 / 7;														
nitrogen fixation	1;														
excretion	3;														
decomposition	2;														
(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>Description of part</th> <th>Name</th> </tr> </thead> <tbody> <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> </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
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)													

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

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481
Email publication.orders@edexcel.com
Order Code UG035458 Summer 2013

For more information on Edexcel qualifications, please visit our website
www.edexcel.com

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual




Llywodraeth Cynulliad Cymru
Welsh Assembly Government

