



Mark Scheme (Results)

Summer 2013

GCSE Biology (5BI3F)  
Paper 01

## 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, please visit our website at [www.edexcel.com](http://www.edexcel.com).

Our website subject pages hold useful resources, support material and live feeds from our subject advisors giving you access to a portal of information. If you have any subject specific questions about this specification that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

[www.edexcel.com/contactus](http://www.edexcel.com/contactus)

### **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](http://www.pearson.com/uk)

Summer 2013

Publications Code UG036859

All the material in this publication is copyright

© Pearson Education Ltd 2013

## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- 

## Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Question Number	Answer	Acceptable answers	Mark
<b>1(a)(i)</b>	<b>D</b> <input checked="" type="checkbox"/> location D		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(a)(ii)</b>	Any <b>two</b> from <ul style="list-style-type: none"> <li>• hunting (1)</li> <li>• collecting food (1)</li> <li>• preparing food (1)</li> <li>• farming (1)</li> <li>• building (1)</li> </ul>	<p>weapons/to kill</p> <p>skinning animals</p> <p>accept cutting/chopping</p> <p>accept sharpening tools/shaping other objects</p> <p>accept starting fires</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(b)(i)</b>	<b>C</b> <input checked="" type="checkbox"/> <i>Homo habilis</i>		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(b)(ii)</b>	A description including any <b>two</b> of <ul style="list-style-type: none"> <li>• increased brain capacity (1)</li> <li>• (stand/walking) upright (1)</li> <li>• increasing height (1)</li> <li>• feet facing forward(1)</li> </ul>	<p>taller/larger/longer legs</p> <p>accept descriptions of changes to facial/skull shape</p> <p>accept descriptions of changes to the arm to leg ratio</p> <p>ignore references to changes in the shape of feet and hands</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(b)(iii)</b>	any size from 400 to 650 (cm <sup>3</sup> )		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)</b>	immune (1) antibodies (1)		<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)</b>	A suggestion including any <b>two</b> from <ul style="list-style-type: none"> <li>• side effects (1)</li> <li>• <u>allergic</u> reactions (1)</li> <li>• unlikely to catch the disease (1)</li> <li>• may get <b>mild form</b> of the disease (from the inoculation) (1)</li> </ul>	<p>named side effect</p> <p>already had the disease/already immune/herd immunity</p> <p>accept scared of needles</p> <p>ignore vague references to risks/harm to the child/may be killed /become ill/(immunisation) not working</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)(i)</b>	a smooth curve through all the points.		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)(ii)</b>	10 000 to 25 000	correct value from their graph	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)(iii)</b>	(the number of bacteria) increases	ignore number of bacteria double every hour	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(d)</b>	A description including <b>two</b> of the following <ul style="list-style-type: none"><li>• warm (1)</li><li>• moist (1)</li><li>• correct pH (1)</li><li>• supply of nutrients (1)</li></ul>	suitable temperature  accept oxygen	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(i)</b>	$(295 + 55 + 20) = 370$ (1) OR $950 - 295 - 55 - 20 =$ (1)  $(950 - 370) = 580$ (million)	2 marks for the correct bald answer	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(ii)</b>	Any <b>one</b> from  <b>increased</b> population /  reduced availability of food e.g. crop failure, war /  reduced availability of land for farming /	lack of space for crops   ignore not enough money unless qualified	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)(i)</b>	<b>C</b> <input checked="" type="checkbox"/> pest management strategy		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)(ii)</b>	An explanation linking <b>two</b> of the following <ul style="list-style-type: none"> <li>• prevent insects destroying crops (1)</li> <li>• increased yield (1)</li> <li>• more profit (1)</li> </ul> OR <ul style="list-style-type: none"> <li>• no need to spray crops (with chemicals) (1)</li> <li>• reduced chemical levels in food (1)</li> </ul>		<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)(i)</b>	<p>An explanation linking the following</p> <ul style="list-style-type: none"> <li>• take up (farm) land (1)</li> <li>• which could have been used to grow food crops (1)</li> </ul>	less space for food crops = 2 marks	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)(ii)</b>	<p>An explanation linking the following</p> <ul style="list-style-type: none"> <li>• renewable energy resource (1)</li> <li>• appropriate reference to fossil fuels/can be re-grown quickly (1)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• remove CO<sub>2</sub> from air when growing</li> <li>• carbon neutral/doesn't increase atmospheric CO<sub>2</sub> level (1)</li> </ul>	<p>sustainable</p> <p>reduces global warming/greenhouse gas levels</p>	<b>(2)</b>



Question Number	Answer	Acceptable answers	Mark
<b>4(a) (i)</b>	42 ± 1 (°C)	accept any whole number or decimal between 41.0 and 43.0	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(a) (ii)</b>	<p>A description including <b>three</b> of the following</p> <ul style="list-style-type: none"> <li>• bacteria (1)</li> <li>• change lactose (1)</li> <li>• into lactic acid (1)</li> <li>• lowers the pH (1)</li> <li>• which changes the shape of milk proteins /coagulate proteins (1)</li> </ul>	<p>ferment lactose</p> <p>sets/thickens/clots the milk/curdles</p> <p>ignore: milk solidifies / hardens</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)</b>	<b>D</b> <input checked="" type="checkbox"/> using aseptic precautions		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(c)</b>	<p>A description including <b>two</b> of the following</p> <ul style="list-style-type: none"> <li>• (microorganisms) grow quickly (1)</li> <li>• independent of climate (1)</li> <li>• easy to manipulate/modify (1)</li> <li>• use waste products as food source (1)</li> <li>• vegetarian alternative to meat (1)</li> </ul>	<p>quicker to produce</p> <p>anywhere in the world</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(d)(i)</b>	<b>A</b> <input checked="" type="checkbox"/> chymosin		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(d)(ii)</b>	<p>A description including <b>two</b> of the following</p> <ul style="list-style-type: none"> <li>• cheaper (1)</li> <li>• more availability of enzyme (to make more cheese) (1)</li> <li>• suitable for vegetarians (1)</li> <li>• fewer religious objections (1)</li> <li>• animal rights / no calves killed (1)</li> </ul>	ignore making the cheese faster	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(a)</b>	<b>A</b> <input checked="" type="checkbox"/> one X chromosome		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark																																				
<b>5(b)(i)</b>	<p>correct gametes (1) correct offspring (1)</p> <p>2</p> <table border="1" style="margin-left: 40px;"> <tr> <td></td> <td>X</td> <td>Y</td> </tr> <tr> <td>X</td> <td>XX</td> <td>XY</td> </tr> <tr> <td>X</td> <td>XX</td> <td>XY</td> </tr> </table> <p>marks</p> <p>1</p> <table border="1" style="margin-left: 40px;"> <tr> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>X</td> <td>XX</td> <td>XX</td> </tr> <tr> <td>Y</td> <td>XY</td> <td>XY</td> </tr> </table> <p>mark</p>		X	Y	X	XX	XY	X	XX	XY		X	X	X	XX	XX	Y	XY	XY	<table border="1" style="margin-left: 40px;"> <tr> <td></td> <td>Y</td> <td>X</td> </tr> <tr> <td>X</td> <td>XY</td> <td>XX</td> </tr> <tr> <td>X</td> <td>XY</td> <td>XX</td> </tr> </table> <p>2 marks</p> <table border="1" style="margin-left: 40px;"> <tr> <td></td> <td>X</td> <td>X</td> </tr> <tr> <td>Y</td> <td>YX</td> <td>YX</td> </tr> <tr> <td>X</td> <td>XX</td> <td>XX</td> </tr> </table> <p>1 mark</p> <p>Please note: XY or YX are both correct. The letters can be written in either order.</p> <p>letters can be upper or lower case.</p> <p>female offspring must be shown as XX and not a single large X</p> <p>ecf – If the gametes are reversed then the Punnett square must be completed correctly and show the valid offspring genotypes, two XX and two XY.</p>		Y	X	X	XY	XX	X	XY	XX		X	X	Y	YX	YX	X	XX	XX	<b>(2)</b>
	X	Y																																					
X	XX	XY																																					
X	XX	XY																																					
	X	X																																					
X	XX	XX																																					
Y	XY	XY																																					
	Y	X																																					
X	XY	XX																																					
X	XY	XX																																					
	X	X																																					
Y	YX	YX																																					
X	XX	XX																																					

Question Number	Answer	Acceptable answers	Mark
<b>5(b)(ii)</b>	50(%)		<b>(1)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*5(c)</b>	<p>A description including some of the following points:</p> <p>Uterus lining</p> <ul style="list-style-type: none"> <li>menstruation occurs between day 1 and 5/6</li> <li>this is when the lining of the uterus is shed</li> <li>the lining of the uterus is then built back up</li> <li>at day 14 ovulation occurs</li> <li>the lining of the uterus is maintained/thickened</li> <li>to prepare for a fertilised ovum</li> <li>if the ovum is not fertilised</li> <li>the cycle starts again</li> </ul> <p>Hormones involved</p> <ul style="list-style-type: none"> <li>oestrogen levels are low in the early part of the cycle</li> <li>oestrogen levels increase prior to ovulation</li> <li>after ovulation oestrogen levels drop</li> <li>the oestrogen levels remain higher than before ovulation</li> <li>from day 1 – 14 progesterone levels are low</li> <li>progesterone levels rise after ovulation</li> <li>hormone levels drop if the ovum is not fertilised</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content	
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>a limited description of the changes in the lining of the uterus wall OR the hormone levels over the 28 day period</li> <li>the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>spelling, punctuation and grammar are used with limited accuracy</li> </ul>	
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>a simple description of the changes in the lining of the uterus wall AND a mention of the role of least one of the hormones</li> <li>the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>spelling, punctuation and grammar are used with some accuracy</li> </ul>	
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>a detailed description of the changes in the lining of the uterus wall AND the role of hormones related to ovulation or uterus lining thickness</li> <li>the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>spelling, punctuation and grammar are used with few errors</li> </ul>	

Question Number	Answer	Acceptable answers	Mark
<b>5(d)</b>	An explanation linking <b>two</b> of the following <ul style="list-style-type: none"><li>• uterus wall maintained/thickened (1)</li><li>• progesterone levels remain high/increase(1)</li></ul>	accept to provide a place for the fertilised egg/embryo/fetus to develop	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6 (a) (i)</b>	12 (1) 12/20 (1) 60 (%)	3 marks for correct bald answer	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6 (a) (ii)</b>	<b>D</b> <input checked="" type="checkbox"/> innate		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(a) (iii)</b>	A suggestion including any <b>two</b> from <ul style="list-style-type: none"> <li>• flatworms are a similar colour as darker rocks (1)</li> <li>• so are camouflaged (1)</li> <li>• less likely to be seen (by predators) (1)</li> </ul>	accept less likely to be eaten	<b>(2)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*6(b)</b>	<p>An explanation including some of the following points</p> <p>Sound signals</p> <ul style="list-style-type: none"> <li>• to attract a mate</li> <li>• to warn about predators</li> <li>• to scare predators away/other animals</li> <li>• to locate young/parents</li> <li>• to establish territory</li> <li>• to maintain social groups</li> </ul> <p>Visual signals</p> <ul style="list-style-type: none"> <li>• to attract a mate</li> <li>• to scare off other animals</li> <li>• to show emotions</li> <li>• feeding of young</li> </ul> <p>Chemical signals</p> <ul style="list-style-type: none"> <li>• to attract a mate</li> <li>• to scare off other animals</li> <li>• to mark territory</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content	
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• a limited description of at least one type of signal OR one use of signal animals use to communicate</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>	
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• a simple description of at least two types of signals animals use to communicate OR a detailed description of one using an example</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>	
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed description of at least two different types of signals animals use to communicate with examples</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>	

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](mailto:publication.orders@edexcel.com)  
Order Code UG036859 Summer 2013

For more information on Edexcel qualifications, please visit our website  
[www.edexcel.com](http://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

