

## **GCSE**

### **Biology B**

Unit **B732/01**: Modules B4, B5, B6 (Foundation Tier)

General Certificate of Secondary Education

### **Mark Scheme for June 2015**

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations used in scoris

Annotation	Meaning
	correct response
	incorrect response
<b>BOD</b>	benefit of the doubt
<b>NBOD</b>	benefit of the doubt <b>not</b> given
<b>ECF</b>	error carried forward
	information omitted
<b>I</b>	ignore
<b>R</b>	reject
<b>CON</b>	contradiction

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

- / = alternative and acceptable answers for the same marking point
- = separates marking points
- allow** = answers that can be accepted
- not** = answers which are not worthy of credit
- reject** = answers which are not worthy of credit
- ignore** = statements which are irrelevant
- ( ) = words which are not essential to gain credit
- = underlined words must be present in answer to score a mark (although not correctly spelt unless otherwise stated)
- ecf = error carried forward
- AW = alternative wording
- ora = or reverse argument

## MARK SCHEME

Question	Answer	Marks	Guidance										
1 a	<table border="1"> <tr><td>✓</td><td></td></tr> <tr><td>✓</td><td></td></tr> <tr><td></td><td>✓</td></tr> <tr><td>(✓)</td><td></td></tr> <tr><td>✓</td><td></td></tr> </table> <p>all 4 correct (2) 3 correct (1) 2 or 1 correct (0)</p>	✓		✓			✓	(✓)		✓		2	<p><b>ignore</b> crosses <b>ignore</b> any line with two ticks <b>ignore</b> tick on 4<sup>th</sup> line (glasshouses)</p>
✓													
✓													
	✓												
(✓)													
✓													
b i	root (hairs) absorb (1) stem transports (1)	2	<b>allow</b> xylem / vascular bundles / veins <b>ignore</b> shoot										
ii	plants / weeds (1)	1	<b>ignore</b> herbs										
	<b>Total</b>	<b>5</b>											

Question	Answer	Marks	Guidance
2 a	<p><b>[Level 3]</b> Gives a full explanation that the slow rate of decay is caused by the absence/low numbers/ inactivity of microorganisms which is linked to low temperature / lack of oxygen. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Gives an explanation explaining that the slow rate of decay is caused by the absence/low numbers/ inactivity of microorganisms. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Gives a partial explanation appreciating that the rate of decay is affected by the presence of microorganisms <b>or</b> temperature <b>or</b> oxygen. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p><b>[Level 0]</b> Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p><b>This question is targeted at grades up to E</b></p> <p><b>Indicative scientific points may include:</b></p> <p>decay depends on the:</p> <ul style="list-style-type: none"> <li>• presence of microorganisms</li> <li>• presence of oxygen</li> <li>• suitable temperature</li> </ul> <p><b>allow</b> decay depends on pH / acidity</p> <p><b>ignore</b> statements just about moisture/water</p> <p>for <b>L1</b> – <b>allow</b> air for oxygen</p> <p><b>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</b></p> <p><b>ignore</b> detritivores</p>
b	<p><b>any two from</b> contain chlorophyll / chloroplasts (1) to absorb light (1) for photosynthesis / to make sugar (1)</p>	2	

Question	Answer	Marks	Guidance
<b>c</b>	idea that elsewhere they are outcompeted (1) BUT elsewhere they are outcompeted for light (2)	2	<b>allow</b> outcompeted for minerals / water / space / nutrients (1) need light without idea of competition = 1
<b>d</b>	osmosis (1)	1	<b>ignore</b> diffusion
	<b>Total</b>	<b>11</b>	

Question	Answer	Marks	Guidance								
3 a i	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="width: 50%;"></td><td style="width: 50%; text-align: center;">✓</td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> </table> <p>(1)</p>		✓							1	more than 1 tick = 0 <b>ignore</b> crosses
	✓										
ii	<table border="1" style="width: 100%; height: 100%;"> <tr><td style="width: 50%;"></td><td style="width: 50%; text-align: center;">✓</td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> <tr><td></td><td></td></tr> </table> <p>(1)</p>		✓							1	more than 1 tick = 0 <b>ignore</b> crosses
	✓										
b i	<p>as the temperature increases, the rate of photosynthesis increases and decreases (1) <b>but</b> as the temperature increases, the rate of photosynthesis increases, <b>levels off</b>, and then decreases (2) <b>plus</b> correct uses of data, e.g.: rises to max rate of 20 (arbitrary units) / rises to max rate at 30 (°C) / decreases after 40 (°C) / rate is zero at 55 (°C) / constant / optimum 28 – 40 (°C)</p>	3	<p>(it) increases and goes down = 0</p> <p>(it) increases, levels off, then decreases (1)</p> <p><b>allow</b> answer in range 28-30 (°C)</p> <p><b>allow</b> answer in range 28-40 (°C)</p>								
ii	<p>answer in range 28-30 (°C) (1) idea that max rate of photosynthesis and heating any more would be wasteful (1)</p>	2	<b>allow</b> value less than 28 (°C) if explains that reduced rate of photosynthesis / yield is balanced by reduced heating costs								

Question	Answer	Marks	Guidance
iii	cost of heaters / cost of heating / payback time for heaters (1) idea of pollution / environmental damage / carbon footprint (1)	2	<b>ignore</b> simply 'cost'  <b>allow</b> idea that gas/oil heaters also release carbon dioxide for photosynthesis (1) <b>allow</b> idea that transpiration might increase / may need more water (1)
	<b>Total</b>	<b>9</b>	

Question	Answer	Marks	Guidance
4 a		2	three correct = 2 marks one or two correct = 1 mark
b	simple (1) pleural (1) X-ray (1)	3	
<b>Total</b>		<b>5</b>	

Question	Answer	Marks	Guidance
5 a	stomach (1)	1	
b	<p><b>any two from:</b>  contains enzymes (1)  to digest / breaks down food (1)</p> <p>contains mucus (1)  sticks food together (1)  lubricates (food) / makes it easier to swallow (1)</p>	2	<p><b>allow</b> amylase / carbohydrase</p> <p><b>ignore</b> moistens unless qualified</p>
c i	<p>0.1 (litre) (2)</p> <p><b>but</b></p> <p>calculation with answer 9.0 or 8.9 (1)</p>	2	
ii	<p><b>any three from:</b>  absorbed into the bloodstream in small intestine (1)  and in large intestine (1)</p> <p>removed by the kidney / passes out in urine (1)</p> <p>removed in sweat / by the skin (1)</p> <p>in breathing (1)</p>	3	<p><b>maximum of two marks for the methods by which water is lost</b></p> <p><b>ignore</b> in respiration</p>
	<b>Total</b>	<b>8</b>	

Question	Answer	Marks	Guidance
6	<p><b>[Level 3]</b>            Answer includes reference to the heart needing oxygen or glucose from the blood  <b>and</b>            appreciates that this is reduced in CHD due to the diameter being narrower  <b>and</b> a consequence is stated.</p> <p>Quality of written communication does not impede communication of the science at this level.            (5 – 6 marks)</p> <p><b>[Level 2]</b>            Answer includes some reference to the heart needing oxygen or food (glucose) <b>and</b>            appreciates that this is reduced with CHD due to the diameter of the coronary artery being narrower.</p> <p>Quality of written communication partly impedes communication of the science at this level.            (3 – 4 marks)</p> <p><b>[Level 1]</b>            Answer includes some reference to the heart needing oxygen or food (glucose)  <b>or</b>            appreciates that blood flow is reduced with CHD / coronary artery is narrower / may lead to heart attack            Quality of written communication impedes communication of the science at this level.            (1 – 2 marks)</p> <p><b>[Level 0]</b>            Insufficient or irrelevant science. Answer not worthy of credit.            (0 marks)</p>	6	<p>This question is targeted up to grade C</p> <p>Indicative scientific points at level 3 may include:</p> <ul style="list-style-type: none"> <li>• Blood supplies heart with oxygen and glucose</li> <li>• This is reduced in CHD</li> <li>• Coronary artery gets narrower</li> <li>• Lack of blood supply stops cells contracting / stops respiration</li> </ul> <p>Indicative scientific points at level 2 may include:</p> <ul style="list-style-type: none"> <li>• Blood supplies heart with oxygen and glucose</li> <li>• This is reduced in CHD</li> <li>• Coronary artery gets narrower</li> </ul> <p>Indicative scientific points at level 1 may include:</p> <ul style="list-style-type: none"> <li>• Blood supplies heart with oxygen / food</li> <li>• This is reduced in CHD</li> <li>• Coronary artery gets narrower</li> <li>• Possible heart attack</li> </ul>
<b>Total</b>		<b>6</b>	

Question	Answer	Marks	Guidance
7 a	<p>Dr Grace:</p> <p>idea that doctors have to decide who gets one (1)</p> <p>Dr Henshaw:</p> <p>idea that (may have to take the organs when) relatives do not agree / relatives may think the donor forgot to opt out (1)</p>	2	<p><b>ignore</b> ref to deciding if to continue treatment</p> <p><b>ignore</b> references to the wishes of the donor</p> <p><b>allow</b> idea that have to decide whether to abide by the relatives wishes</p>
b i	<p><b>any two from:</b> (in the opt out system)</p> <p>people do not need to do anything to donate (1) ORA</p> <p>idea that organs may be donated even though donors did not wish this (1)</p> <p>they may forget to opt out / did not know they had to opt out / did not have time to opt out (1)</p>	2	<p><b>ignore</b> don't need a card to donate</p>
ii	<p>it supports it because mean/ average of the three countries with <b>opt out</b> is higher (1)</p> <p>however one country with opt out (Poland) the numbers are lower / only data from six countries given (1)</p>	2	<p><b>allow</b> more people donating in <b>opt out</b> countries</p>
	<b>Total</b>	<b>6</b>	

Question	Answer	Marks	Guidance
8 a		2	three correct =1 mark one or two correct = 1 mark
b i	protein (1)	1	allow polypeptides (1)
ii	any two from: need to use people to measure taste (1) people's taste differs (1) people have different opinions/ it is a matter of opinion (1)	2	<b>allow</b> a machine cannot measure taste / cannot test taste scientifically
iii	can produce large(r) amounts/can produce more quickly (1)	1	<b>allow</b> do not need to kill animals / do not need to extract it from animals / be sure of consistent structure <b>allow</b> idea that enzyme can be exactly the one needed (and not a similar one from an animal) <b>ignore</b> cheaper unless qualified
	<b>Total</b>	<b>6</b>	

Question	Answer	Marks	Guidance
9 a	viruses(1)	1	
b	<p>10 x 100 000 = 1 000 000 bacteria present in soil sample (1)</p> <p><b>but</b></p> <p>no, because 1 000 000 is less than 3 000 000 / less than the figure in the table (2)</p>	2	<p><b>allow</b> 3 000 000 / 1 000 000 = 30 (1)</p> <p><b>allow</b> no, because there are ten colonies but there should be 30 (2)</p>
c	<p>improve soil structure (1)</p> <p>improve soil fertility (1)</p>	2	<p><b>allow</b> increase the mineral content</p> <p><b>allow</b> burying organic matter (for decomposition) / increase the rate of decay (1)</p> <p>aerating the soil (providing oxygen to roots/soil organisms) (1)</p> <p>(tunnels) draining the soil (1)</p> <p>mixing up soil layers (1)</p> <p>neutralising acidic soils (1)</p>
	<b>Total</b>	<b>5</b>	

Question	Answer	Marks	Guidance
10 a	giving cows antibiotics makes them produce more milk (1) idea that after 5 months the extra milk gained is not worth the cost of the antibiotics (1)	2	must be comparative must refer to cost <b>ignore</b> little difference so not worth doing it
	<p><b>[Level 3]</b> Answer explains the variation in the yogurt with the ability of antibiotics to kill bacteria <b>and</b> gives a detailed account of yogurt production. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Answer explains the variation in the yogurt with the ability of antibiotics to kill bacteria <b>or</b> gives a detailed account of yogurt production. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Answer appreciates that bacteria are added to milk to make yogurt <b>or</b> shows an appreciation that antibiotics kill bacteria <b>or</b> idea that antibiotics ruin yogurt making.  Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p><b>[Level 0]</b> Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p><b>This question is targeted at grades up to C.</b></p> <p><b>Indicative scientific points about yogurt making may include:</b></p> <ul style="list-style-type: none"> <li>• sterilisation of equipment / pasteurisation of milk</li> <li>• addition of bacteria</li> <li>• incubation</li> <li>• sampling, flavouring and packaging</li> </ul> <p>allow higher level references to <i>Lactobacillus</i> and production of lactic acid</p> <p><b>Indicative scientific points about the graph may include:</b></p> <ul style="list-style-type: none"> <li>• increasing antibiotic concentration means yogurt making is less successful</li> <li>• antibiotics will kill the bacteria that are added to make yogurt</li> </ul> <p><b>Use the L1, L2, L3 annotations in Scoris. Do not use ticks.</b></p>
<b>Total</b>		<b>8</b>	

Question	Answer	Marks	Guidance
11 a	phytoplankton (1)	1	
b	any two from: (dead) plants/algae rot/decompose/breakdown (1) (by) decomposers / bacteria (1) (so) less oxygen (1) (so) fish cannot respire (1)	2	if no other mark awarded allow 1 mark for lack of food for fish (1)
c i	(maximum) depth (that disc can be seen) is decreasing (1) more plants are making the water less clear (1)	2	ignore numbers / plots go down
ii	(Yes), the water is starting to clear / (maximum) depth (that disc can be seen) is increasing (1)	1	ignore numbers / plots go up
<b>Total</b>		<b>6</b>	

Question	Answer	Marks	Guidance
12 a i	all points correctly plotted (2) 2 or 3 correctly plotted (1)	2	<b>allow</b> +/- half a square <b>ignore</b> any line drawn
ii	(yes) as length of pregnancy increase so does life span / AW / ORA (1)  (no) not all animals fit the pattern / too many inconsistencies / there are anomalies / specific anomaly stated eg: <b>hippos</b> have shorter pregnancy than gorillas but longer life span / <b>giraffes</b> have longer pregnancy than hippos / gorillas but have shorter life span / <b>giraffes</b> and lions have the same life spans but different length pregnancies (1)	2	no mark for simply 'yes' or 'no'
iii	<b>any two from:</b> yes (no mark) only 6 animals in table (1)  too many inconsistencies / there are anomalies / specific anomaly stated (1)  table only shows African animals / table only show mammals (1)	2	<b>ignore</b> need more results unless qualified / not enough information <b>ignore</b> results don't fit the pattern / no link
b i	<b>any two from:</b> as mass increases, heart rate decreases / AW / ORA (1)  as mass increases, life span increases / AW / ORA (1)  as heart rate decreases, life span increases / AW / ORA (1)	2	if get 2 correct and 1 wrong then award 2 marks  'as mass increases, heart rate decreases and life span increases' = (2)

Question	Answer	Marks	Guidance
ii	<p>(yes) – idea that the life time heart beats are all around 1 or 2 billion (1)</p> <p>(no) – idea that some life time heart beats are more than twice / three times the value of others / AW OR chicken does not fit pattern (1)</p>	2	<p><b>ignore</b> most are about the same (simply repeating question) <b>allow</b> all between 0.7-2.2 billion / within 1.5 billion</p> <p>(yes) – idea that most are about the 1 billion / within 0.5 billion, but chicken is the odd one out as it's about 2 billion / a lot more = (2)</p> <p><b>allow additional marking point:</b> sample is not large enough to reach a valid conclusion (1) idea that there is still a large difference between eg 0.7 and 0.8 billion (1)</p>
	<b>Total</b>	<b>10</b>	

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