



Mark Scheme (Results)

Summer 2013

International GCSE
Biology (4BI0) Paper 2B

Edexcel Level 1/Level 2 Certificate
Biology (KBI0) Paper 2B

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Question number	Answer	Notes	Marks
1 (a)	adenine / thymine / guanine / cytosine;	ignore A, T, G and C	1
(b)	1 (kill) bacteria / (kill) pathogens / fungi / microbes / viruses / eq; 2 prevent disease / prevent infection / prevent spread of disease / prevent spread of infection; 3 affect growth (of explant) / (less) competition (for minerals);	allow remove bacteria / get rid of bacteria / eq	max 2
(c)	protein / enzymes / named protein;	ignore other molecules - DNA	1
(d)	organism / bacterium / virus / fungus that causes disease / infection;	ignore harm / illness	1
(e)	1 identical / clones / all same / no variation / eq; 2 large quantities / more / high yield / eq; 3 fast / faster / eq; 4 free from disease / free from pathogens / eq; 5 all year production / prevent extinction / eq;	ignore quality and characteristics being controlled ignore cost /cheaper ignore conservation	max 2

Question number	Answer	Notes	Marks
(f)	never runs out / renewable / can be replaced / can be grown again / unlimited supply / eq;	ignore never dies out ignore reproduced ignore reused	1
(g)	1 leaching / eutrophication / run off / eq; 2 soil erosion / flooding / eq; 3 rain(fall) / water cycle effect / less transpiration / drought / desertification / eq; 4 global warming / greenhouse (effect) / (more) CO ₂ in air / less CO ₂ removed / eq; 5 loss of medicinal plants / eq;	ignore extinction / food chain effect ignore loss of habitat ignore loss of species / less biodiversity ignore climate change ignore loss of wood resource ignore aesthetic appearance	max 3
		Total	11

Question number	Answer	Notes	Marks										
2 (a)	<table border="1"> <thead> <tr> <th data-bbox="398 331 1028 443">Description of stage</th> <th data-bbox="1028 331 1554 443">Name of stage</th> </tr> </thead> <tbody> <tr> <td data-bbox="398 443 1028 639">Heat from the sun causes liquid water to change into water vapour</td> <td data-bbox="1028 443 1554 639">evaporation</td> </tr> <tr> <td data-bbox="398 639 1028 836">Water vapour in the air changes back into liquid water</td> <td data-bbox="1028 639 1554 836">condensation;</td> </tr> <tr> <td data-bbox="398 836 1028 999">The liquid water falls to the earth</td> <td data-bbox="1028 836 1554 999">precipitation / rain(fall) / snow;</td> </tr> <tr> <td data-bbox="398 999 1028 1142">loss/evaporation/diffusion of water from leaves/plant / stomata;</td> <td data-bbox="1028 999 1554 1142">transpiration</td> </tr> </tbody> </table>	Description of stage	Name of stage	Heat from the sun causes liquid water to change into water vapour	evaporation	Water vapour in the air changes back into liquid water	condensation;	The liquid water falls to the earth	precipitation / rain(fall) / snow;	loss/evaporation/diffusion of water from leaves/plant / stomata;	transpiration	<p>ignore guard cells.</p> <p>water loss and plant needed for the mark</p>	3
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Heat from the sun causes liquid water to change into water vapour	evaporation												
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Question number	Answer	Notes	Marks
2 (b)	1 (more) bacteria / fungi / microbes / microorganisms; 2 decomposition / decompose(rs); 3 respiration; 4 (less) oxygen; 5 fish die / animals die; 6 mineral ions / named mineral ion / nutrients; 7 plant growth / algal bloom / eq; 8 <u>eutrophication</u> ;	ignore disease ignore plant death; ignore blocking light / less photosynthesis	4
		Total	7

Question number	Answer	Notes	Marks									
3 (a)	(i) changed (by scientist) / altered (by student) / variable that is changed / eq;		1									
	(ii) volume of water (collected) / water in cm ³ ;	allow amount of water	1									
	(iii)		ignore time taken / variable that is measured / volume of water added	1								
		<table border="1"> <thead> <tr> <th>Variable</th> <th>Tick</th> </tr> </thead> <tbody> <tr> <td>mass of dry soil</td> <td>✓</td> </tr> <tr> <td>size of measuring cylinder</td> <td></td> </tr> <tr> <td>volume of water collected</td> <td></td> </tr> </tbody> </table>	Variable		Tick	mass of dry soil	✓	size of measuring cylinder		volume of water collected		
		Variable	Tick									
mass of dry soil	✓											
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volume of water collected												
(iv) 7.1(428) / 7.14 / 7.143;	allow one mark for 7.142 or 14 in working	2										
(v) (A) (more) decimal places / hundredths / smaller scale interval / eq;	ignore milliseconds ignore digital ignore split seconds	1										
(b)	(i) less water / water drains away / eq; less anchorage / eq;	ignore mineral ions	2									
	(ii) (less) oxygen / not aerobic; active transport / active uptake; respiration / energy / ATP;	ignore ref to mineral ion or water concentration gradient or waterlogged	max 2									
		Total	10									

Question number	Answer	Notes	Marks
4 (a)	(i) same <u>alleles</u> / DD / dd / both dominant / both recessive / only one type of allele / eq;	ignore only one allele present allow other letters eg AA or aa. reject <u>genes</u>	1
	(ii) DD; Dd;		2
(b)	(i) mother DD and father dd; Dd and Dd;	Allow any ratio 0: whatever	2
	(ii) zero / 0(%) / no chance / 0 out of 2 / eq;		1
(c)	(i) 22 800 000 / 22.8 million;	allow one mark for 12 or 0.12 in working	2
	(ii) not enough people tested / small sample / only 24 tested / chance / probability / eq;		1
		Total	9

Question number	Answer	Notes	Marks
5 (a)	removal / eq; waste products of cells / metabolism / respiration / chemical reactions;	getting rid of toxic waste = 1 ignore toxic ignore examples such as CO ₂ / urea MP2 reject if ref to egestion/faeces	2
(b) (i)	release <u>sweat</u> / <u>sweating</u> / eq; evaporation / eq; cooling / heat loss / eq;		3
(ii)	vasodilation / dilate / widen / expand / eq; (more) <u>blood</u> to skin/surface / <u>blood</u> near to skin/surface; cooling / heat loss / eq;	ignore names of blood vessels ignore vasoconstriction reject blood vessels moving	3
(c) (i)	lower blood glucose / lower blood sugar / eq; glycogen; liver / muscle;	must be stated converts glucose to glycogen = 1	max 2
(ii)	1 control water level / water regulation / osmoregulation / eq; 2 permeability / eq; 3 <u>collecting duct</u> ; 4 water reabsorption / water into blood / water into body / less waterloss from body / more concentrated urine / less urine / eq;		max 3
		Total	13

Question number	Answer	Notes	Marks
6 (a)	<i>Lactobacillus (bulgaricus)</i> / <i>Streptococcus (thermophilus)</i> ;	ignore lactic acid bacteria	1
(b)	sterilise / kill / pasteurise; bacteria / microorganisms / pathogens / eq;	ignore get rid of ignore denature enzymes ignore taste / competition / contamination / disease	2
(c)	1 avoid <u>killing</u> <i>Lactobacillus</i> / bacteria / organisms (that make yoghurt); 2 <u>optimum</u> temperature; 3 enzymes; 4 (enzymes) denatured / destroyed;	ignore denature organism allow converse ignore make lactic acid / make yoghurt	2
(d)	(time) to make lactic acid; (warm) <u>optimum</u> temperature; enzymes; bacteria reproduction / bacteria growth / eq;		max 2
(e)	kills bacteria / stop growth of bacteria; low pH / more acid / acidic / lactic acid / eq; denatures/destroys enzymes / alters active site / eq;	allow microbes as eq to bacteria denatures bacteria = 1	3
		Total	10
		Total for paper	60

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