

# Mark Scheme (Results)

January 2012

International GCSE Biology (4BI0)  
Paper 1B  
Science Double Award (4SC0) Paper  
1B

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**INTERNATIONAL GCSE BIOLOGY 4BIO 4SCO /1B – JANUARY 2012**

Question number	Answer	Notes	Marks
1 (a) (i)	Lactobacillus;	Allow approx. spelling	1
(ii)	Mucor;		1
(iii)	bean;		1
(iv)	mosquito;		1
(b) (i)	only reproduce in living cells / eq; protein coat; <u>only</u> DNA / <u>only</u> RNA / one type of nucleic acid / eq;  smaller; no organelles; no cytoplasm; no mitochondria;  do not move; do not respire; do not feed; no sensitivity; do not grow; do not excrete / produce waste;	ignore cell wall / cell membrane / chloroplast / nucleus / nucleiod / multicellular	max 3
(ii)	HIV / eq; human / eq; AIDS / effects immune system / eq;	if named disease wrong still allow effect ignore organs	3

**TOTAL 10 MARKS**

Question number	Answer	Notes	Marks
2	DNA; nucleus; chromosomes; thymine / T; guanine / G; mutation;		6

**TOTAL 6 MARKS**

Question number	Answer	Notes	Marks
3 (a) (i)	<p>genes / alleles / eq;  inherited / passed on / eq;  parent/offspring height  described;</p> <p>reduce growth;  <u>compete</u>;  light / minerals / water /  carbon dioxide / eq;</p>	<p>eg tall / short /  big / small / high  / low</p> <p>allow nutrients /  moisture</p>	max 2
	(ii)	<p>improve growth;  decomposition / decomposers /  eq;  minerals / named mineral /  nutrient / salts / ions /  ammonium / nitrogen fixing /  nitrifying;</p> <p>or</p> <p>reduce growth;  infection / disease / attack /  harm / eq;  pathogen;</p>	max 2
(b) (i)	<p>unwanted plant / of no use /  described reason for not  wanted / eq;</p>		1
	(ii)	<p>(less) <u>competition</u>;  light;  carbon dioxide;  water;  minerals / nutrients / salts /  ions / eq;</p>	max 2
	(iii)	<p>herbicide / weedkiller /  chemical that kills / pesticide /  eq;  pull them up / eq;</p>	max 1

TOTAL 8 MARKS

Question number	Answer	Notes	Marks
4 (a)	90 / tube 3 at 30 °C;  tube at 25 °C / tube at different temperature / miscounted / human error / different food / fertility / fecundity / eq;	wrong anomalous result = 0 for question  ignore other numbers different	2
(b) (i)	10 male and 12 female;		1
(ii)	tube 4 at 35°C;		1
(c)	repeated / described replication / eq;  similar numbers / similar pattern / eq;	similar results in all tubes = 2 five tubes had similar results = 2	2
(d)	less at 16 °C / less at lower temperatures / idea of increase / eq;  optimum at 25 °C / more at 25 °C;  less at 30 °C / 35 °C / less at higher temperatures / idea of decrease / eq;  none at 45 °C / eq;  enzymes;		max 3

**TOTAL 9 MARKS**

Question number	Answer	Notes	Marks
5 (a)	<u>small surface area to volume</u> (ratio);  less heat loss / less energy loss maintain body temp. / keep warm / fat insulation / eq;	allow small surface area to mass (ratio)	2
(b)	<u>insulation</u> / <u>insulator</u> / <u>insulated</u> ; trap air; less heat loss / less energy loss / maintain body temp. / keep warm / trap heat / eq;		max 2
5 (c) (i)	muscles kept warm / eq; <u>contract</u> ; respiration; enzymes / optimum;	allow converse ignore work / move ignore answers that describe position in feet	max 3
(ii)	strong / not elastic / eq;	allow descriptions of strength eg will not snap strong and elastic = 0	1
(d)	less heat loss / less energy loss / maintain body temp. / keep warm / share body heat / trap heat / eq;  shelter / protect / not exposed (cold/wind) / eq;  decrease SA:Vol;	ignore protect from predators	2

**TOTAL 10 MARKS**

Question number	Answer	Notes	Marks														
6 (a)	<table border="1"> <thead> <tr> <th>Illness</th> <th>Organ needed to cure illness</th> </tr> </thead> <tbody> <tr> <td>uremia</td> <td>(kidney)</td> </tr> <tr> <td>emphysema</td> <td>lung(s);</td> </tr> <tr> <td>coronary failure</td> <td>heart;</td> </tr> <tr> <td>diabetes</td> <td>pancreas;</td> </tr> <tr> <td>hepatitis</td> <td>liver;</td> </tr> <tr> <td>poor vision</td> <td>cornea(s);</td> </tr> </tbody> </table>	Illness	Organ needed to cure illness	uremia	(kidney)	emphysema	lung(s);	coronary failure	heart;	diabetes	pancreas;	hepatitis	liver;	poor vision	cornea(s);		5
Illness	Organ needed to cure illness																
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(b)	bile; emulsifies / large drops to small drops / eq; neutralise / optimum pH / alkaline;		2														
(c) (i)	genetically / gene / allele / DNA; identical / same / eq;	ignore similar	2														
(ii)	lots / no shortage / no delay / better supply / always available / eq;  no rejection / match / accepted by body / eq;  no problems with relatives / eq;	allow ref to blood type	2														

**TOTAL 11 MARKS**

Question number	Answer	Notes	Marks																
7 (a) (i)	9.8(03922%);; allow one for 0.51 in working		2																
(ii)	different masses / different sizes / <u>valid</u> comparison;		1																
(b)	water <u>enters</u> / water <u>in</u> / eq; dilute to more concentrated solution / eq; partially permeable membrane / eq;	interpret the term concentration alone as being water molecules	3																
7 (c)	<table border="1"> <thead> <tr> <th>Cube of side in cm</th> <th>SA in cm<sup>2</sup></th> <th>Volume in cm<sup>3</sup></th> <th>SA/Vol ratio</th> </tr> </thead> <tbody> <tr> <td>(0.5)</td> <td>(1.5)</td> <td>(0.125)</td> <td>(12)</td> </tr> <tr> <td>(1.0)</td> <td>6</td> <td>1</td> <td>6</td> </tr> <tr> <td>(2.0)</td> <td>24;</td> <td>8;</td> <td>3;</td> </tr> </tbody> </table>	Cube of side in cm	SA in cm <sup>2</sup>	Volume in cm <sup>3</sup>	SA/Vol ratio	(0.5)	(1.5)	(0.125)	(12)	(1.0)	6	1	6	(2.0)	24;	8;	3;	one mark for each pair	3
Cube of side in cm	SA in cm <sup>2</sup>	Volume in cm <sup>3</sup>	SA/Vol ratio																
(0.5)	(1.5)	(0.125)	(12)																
(1.0)	6	1	6																
(2.0)	24;	8;	3;																
(d)	more osmosis / faster (small cubes) / greater % increase / greater % change / eq;  larger SA:Vol ratio (of small cubes);	allow converse	max 2																
(e)	cell wall; cell membrane; cytoplasm; vacuole; nucleus; chloroplast;	5 to 6 = 3 3 to 4 = 2 1 to 2 = 1	max 3																

TOTAL 14 MARKS



Question number	Answer	Notes	Marks												
8 (a)	<table border="1"> <thead> <tr> <th>Order</th> <th>Name of stage</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>gametes;</td> </tr> <tr> <td>2</td> <td>zygote</td> </tr> <tr> <td>3</td> <td>embryo</td> </tr> <tr> <td>4</td> <td>fetus;;</td> </tr> <tr> <td>5</td> <td>baby;</td> </tr> </tbody> </table>	Order	Name of stage	1	gametes;	2	zygote	3	embryo	4	fetus;;	5	baby;	1 mark for gametes 1 mark for baby 2 marks for zef  1 mark for zfe or ezf or fez	4
Order	Name of stage														
1	gametes;														
2	zygote														
3	embryo														
4	fetus;;														
5	baby;														
(b) (i)	connection between <u>atria</u> / eq; connection between arteries / pulmonary artery and aorta;		2												
8 (c) (i)	XY;		1												
(ii)	46 or 23 <u>pairs</u>		1												

**TOTAL 8 MARKS**

Question number	Answer	Notes	Marks
9	large surface area; thin (leaf); upper epidermis / cuticle; transparent / lets light through; chloroplasts / chlorophyll; palisade (mesophyll); close to surface; absorb <u>light</u> ; spongy (mesophyll); diffusion; stomata / guard cells; carbon dioxide; xylem; water; ignore if transpired	mark points independently  allow carbon dioxide and water if given in an equation	max 6

**TOTAL 6 MARKS**

Question number	Answer	Notes	Marks
10 (a) (i)	<p>named ion; eg. nitrate / magnesium / phosphate / sulphate / iron / potassium / calcium</p> <p>use of ion;</p>	<p>eg. nitrate for amino acids / protein / nucleic acid / eq</p> <p>allow Mg and chloroplast</p> <p>allow symbols</p> <p>ignore nitrogen / copper</p>	2
(b) (i)	<p>S – scale linear and half grid in one direction;</p> <p>L – line straight and through points;</p> <p>A1 – axes correct way round;</p> <p>A2 – axes labelled (days and number/leaves);</p> <p>P – points plotted accurately;</p> <p>K – key;</p>	<p>if leaves plot as zero for day 0 lose P but allow L</p> <p>if leaves plot as 10 for day 0 allow P and L</p>	6
(ii)	<p>light;</p> <p>temperature;</p> <p>carbon dioxide;</p> <p>pH;</p> <p>humidity; ignore water wind;</p>	ignore ref to plant	max 3

TOTAL 11 MARKS

Question number	Answer	Notes	Marks
11	<p><u>mutation</u>;</p> <p><u>competition</u>;</p> <p>tail attractive (to female) / selected (by female) / chosen (by female);</p> <p>reproduce / mate / eq;</p> <p>offspring have larger/more colourful tails / pass on characteristic;</p> <p><u>gene/allele</u> (passed on / inherited);</p> <p>process continues / tail changes over time / evolution / eq;</p> <p>survival / fittest / <u>extinction</u>;</p>	<p>ignore camouflage</p> <p>allow points if predation discussed</p> <p>allow converse</p>	max 5

TOTAL 5 MARKS

Question number	Answer	Notes	Marks
12	<p>C noise and no noise / range of noise;</p> <p>O same species / mass / seeds / amount of crop / eq;</p> <p>R replication evident;</p> <p>M1 mass eaten / number eaten / count birds / eq;</p> <p>M2 time period stated;</p> <p>S1 weather / season / temperature / wind / same time of day / eq;</p> <p>S2 same number / species of bird / same area / field size / quadrat / eq;</p>	<p>allow amount / how much / how many</p> <p>allow temperature if in field</p> <p>ignore same field</p>	max 6

**TOTAL 6 MARKS**

Question number	Answer	Notes	Marks
13 (a)	shape; order; names; ignore order width to scale / area to scale;	allow names or levels	4
(b)	pyramid shape;  different organisms have different masses / less mass further up pyramid / bush has greatest biomass / different bar widths / eq;	allow size	2
13 (c)	respiration; uneaten / not all eaten;  not digested / indigestible; death / decomposition / eq;		max 2
(d)	decrease;  less caterpillars / less food / less bush / eq;		2

**TOTAL 10 MARKS**

Question number	Answer	Notes	Marks
14	<p>control intraspecific predation / control overcrowding / separate sizes / separate ages / eq;</p> <p>control interspecific predation / killing predators;</p> <p>control disease / infection; antibiotics / remove dead fish; biological control of pests / eq;</p> <p>control oxygen; remove waste products;</p> <p>frequent feeding / feed small amounts; (high) <u>protein</u> diet;</p> <p>selective breeding / eq; hormones;</p>	ignore clean water	max 6

**TOTAL 6 MARKS**

**PAPER TOTAL: 120 MARKS**



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