

Mark Scheme (Results)

Summer 2013

International GCSE  
Biology (4BI0) Paper 1BR

Science Double Award (4SC0)  
Paper 1BR

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Question number	Answer					Notes	Marks																				
1 (a)	<table border="1"> <thead> <tr> <th data-bbox="499 261 943 300">Group</th> <th data-bbox="943 261 1382 300">Example</th> </tr> </thead> <tbody> <tr> <td data-bbox="499 300 943 338">animals</td> <td data-bbox="943 300 1382 338">human / eq;</td> </tr> <tr> <td data-bbox="499 338 943 376">fungi</td> <td data-bbox="943 338 1382 376"><i>Mucor</i> / eq;</td> </tr> <tr> <td data-bbox="499 376 943 486">bacteria</td> <td data-bbox="943 376 1382 486"><i>Lactobacillus</i> / <i>Pneumococcus</i> / Salmonella / eq;</td> </tr> <tr> <td data-bbox="499 486 943 595">protocists</td> <td data-bbox="943 486 1382 595"><i>Amoeba</i> / <i>Chlorella</i> / <i>Plasmodium</i> / seaweed / algae / eq;</td> </tr> </tbody> </table>					Group	Example	animals	human / eq;	fungi	<i>Mucor</i> / eq;	bacteria	<i>Lactobacillus</i> / <i>Pneumococcus</i> / Salmonella / eq;	protocists	<i>Amoeba</i> / <i>Chlorella</i> / <i>Plasmodium</i> / seaweed / algae / eq;	allow mammals / birds / eq allow mushroom / yeast / mould toadstool / ignore named disease / athlete's foot ignore malaria	4										
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fungi	some	(all)	none	(all);																							
bacteria	none	none	(some)	(all);																							
protocists	(none)	all	(some)	some;																							

Question number	Answer	Notes	Marks
1 (c) (i)	smaller; protein coat / no cell wall / eq; no cell membrane; no cytoplasm / no organelles / no plasmids / no ribosome / eq; no <u>flagellum</u> ;	ignore reference to shape and reproduction ignore nucleus / Golgi / mitochondria / eq allow converse ignore HIV	1
	(ii)	tobacco mosaic / AIDS / <u>influenza</u> / any correct flu / cold / measles / eq;	1
		<b>Total</b>	<b>9</b>

Question number	Answer	Notes	Marks
2 (a) (i)	correctly labelled;	ignore other labels if label line goes to wall and membrane = 0	1
(ii)	cell wall; chloroplast; vacuole;	ignore chlorophyll	3
(b) (i)	LHS / water level lower than RHS / sucrose level;	labelling not required	1
(ii)	<u>osmosis</u> ;	ignore diffusion	1
		<b>Total</b>	<b>6</b>

Question number	Answer	Notes	Marks														
3	<table border="1"> <thead> <tr> <th data-bbox="394 288 853 363">event</th> <th data-bbox="853 288 1281 363">letter</th> </tr> </thead> <tbody> <tr> <td data-bbox="394 363 853 438">fertilisation</td> <td data-bbox="853 363 1281 438">(P)</td> </tr> <tr> <td data-bbox="394 438 853 513">release of oestrogen</td> <td data-bbox="853 438 1281 513">Q; ONLY</td> </tr> <tr> <td data-bbox="394 513 853 588">meiosis</td> <td data-bbox="853 513 1281 588">Q and V; ONLY in any order</td> </tr> <tr> <td data-bbox="394 588 853 663">repair of the uterus lining</td> <td data-bbox="853 588 1281 663">R; ONLY</td> </tr> <tr> <td data-bbox="394 663 853 738">implantation of an embryo</td> <td data-bbox="853 663 1281 738">R; ONLY</td> </tr> <tr> <td data-bbox="394 738 853 813">formation of gametes</td> <td data-bbox="853 738 1281 813">Q and V; ONLY in any order</td> </tr> </tbody> </table>	event	letter	fertilisation	(P)	release of oestrogen	Q; ONLY	meiosis	Q and V; ONLY in any order	repair of the uterus lining	R; ONLY	implantation of an embryo	R; ONLY	formation of gametes	Q and V; ONLY in any order	<p>only give mark if correct letter(s) given  one correct and one wrong = 0  allow lower case letters</p>	5
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		<b>Total</b>	<b>5</b>														

Question number	Answer	Notes	Marks
4 (a) (i)	all names present and parakeet in middle; arrows in right direction;		2
(ii)	digested / broken down; amylase / carbohydrase; maltose / glucose / sugar;	ignore enzyme ignore maltase ignore absorbed in small intestine	3
(b) (i)	25.5;;	allow one mark for 2 or 27.5 in working	2
(ii)	increase (volume of oxygen) / eq; (more) respiration; heat loss / eq;	ignore keep warm ignore reference to maintain body temperature	3
		<b>Total</b>	<b>10</b>

Question number	Answer	Notes	Marks
5 (a)	S scale linear + use of at least half grid; L lines on bars neat; A axes correct way; A axes labelled energy + kJ per m <sup>2</sup> per year and A,B,C,D / eq; P bars at correct height;	L lost if points plotted allow yr or y for year allow kJ m <sup>-2</sup> yr <sup>-1</sup>	5
(b)	temperature / heat; (sun)light / light intensity; wavelength / colour; water / rain; minerals / ions / salts / named mineral / nutrients;	ignore humidity	3
(c) (i)	(less) pests / disease control / pesticides / eq; biological control / predators; fertiliser / fertile soil / crop rotation / legumes / eq; irrigation / watered; replanting / several plantings per year; GM / species of plant / different strains / eq; weed removal;	ignore pollution / CO <sub>2</sub> levels or other abiotic factors ignore glasshouse / polythene	2
(ii)	man / human / you / farmer; desired characteristic / named feature / eq; breed / produce offspring / eq; many generations / eq;		4
(d)	several / use more than one / sample / repeat / eq; <u>random</u> ; weigh / method of weighing / scales / eq; remove animals / consumers / soil; multiply to total area / scaling;	allow if implicit ignore count / measure biomass ignore average	Max 4
		<b>Total</b>	<b>18</b>



Question number	Answer	Notes	Marks
6	restriction (enzyme); <u>human</u> DNA / gene / allele; ligase; use <u>same</u> restriction enzyme; plasmid; <u>recombinant</u> (DNA/plasmid); <u>vector</u> ; insulin / factor VIII / named protein;	reject lipase	Max 5
		<b>Total</b>	<b>5</b>

Question number	Answer	Notes	Marks
7 (a)	evaporation / loss of water / diffusion; surface of plant / stomata / from leaves / from plant / eq;		2
(b)	stop water loss (from soil) / stop evaporation (from soil) / water can only be lost through plant / eq;	ignore prevent water into soil	1
(c)	<u>kinetic</u> energy; molecules move faster / eq; stomata; open in light / close in dark; diffusion / evaporation / transpiration;	ignore guard cells	4
		<b>Total</b>	<b>7</b>

Question number	Answer	Notes	Marks
8 (a) (i)	lungs;		1
(ii)	diaphragm;	allow phonetic spelling	1
(iii)	trachea / windpipe;	eg dyaphram	1
(iv)	bronchus / bronchi;	ignore bronchioles / ignore right and left	1
(b)	balloons inflate / air into balloons / eq; <u>volume</u> (in model) increases / more space (in model) / eq; <u>pressure</u> decreases / eq;	ignore vacuum ignore area	3
(c)	(no) ribs / ribcage; (no) (intercostal) muscles; (no) pleural membranes; (no) movement (of chest) / up and out / expansion;	allow converse	2
(d)	1 rest <u>and</u> exercise / range of exercise / jog and run / eq; 2 (how) count breaths / how many breaths / amount of breaths / volume / eq; 3 for time / seconds / minutes / eq; 4 quantification of exercise / jog for 5 minutes / do 10 press ups; 5 repeat (for reliability);	1 allow if implied 2 ignore measure breathing - need method 3 is measure rate mark not exercise quantified 5 allow average	4
		<b>Total</b>	<b>13</b>

Question number	Answer	Notes	Marks
9 (a)	faeces / stool / urine / urea / ammonia / carbon dioxide / eq;	ignore <u>excretion</u> / poo	1
(b) (i)	(maintain) oxygen; (less) decomposition / respiration; bacteria / fungi / microbes / eq;	allow respiration for fish or bacteria ignore disease	2
(ii)	less nutrients / algal growth / eutrophication / eq;  kill/less bacteria / pathogens / microbes / eq; (less) disease / infection;	reject kill viruses ignore healthy	2
(c)	bacteria / fungi / microbes / eq; decompose(rs) / decay / rot / breakdown / eq; mineral ions / nutrients / named mineral ion / nitrate / eq; amino acids / proteins; respiration (by bacteria); carbon dioxide; photosynthesis;	ignore fertiliser	Max 4
(d)	separate species / nets / cages / fences / shooting / eq;	ignore intraspecific ignore feed lots separate = 0	1
		<b>Total</b>	<b>10</b>

Question number	Answer	Notes	Marks
10 (a)	1 ZZ ZW; (gender must be clear) 2 Z Z (and) W; 3 ZZ ZW; 4 male female;	X and Y alone = 0 allow 2 and 3 in Punnett square and 1 and 4 if labelled	4
(b) (i)	protein; amino acids / muscles / bone / enzymes / cells / tissues / eq; (ii) fats / lipids / cholesterol / (named) carbohydrate; energy / cell membrane; (iii) respiration;  (less) dehydration / eq; protection / less chance of breaking / prevents cracking / eq;  cheese / fish / eggs / milk / low-fat spreads / yoghurt / liver / carrots / sweet potatoes / eq; immunity / vision (in dim light) / healthy skin / bone <u>metabolism</u> / gene transcription / embryo development / eq;	ignore calcium ignore vitamins	2  Max 1  2
(c)	meiosis; gametes / sex cells / sperm <u>and</u> egg; haploid / n / half / 23; fertilization / fuse / combine / join / eq; diploid / 2n / full set / 46;		Max 3
		<b>Total</b>	<b>12</b>

Question number	Answer	Notes	Marks
11	<u>nucleus</u> from body cell / <u>nucleus</u> from adult cell / <u>nucleus</u> from adult / eq; egg / ovum; remove nucleus (from egg) / enucleate (from egg); nucleus into (empty) <u>egg</u> cell; electricity; <u>mitosis</u> ; <u>embryo</u> ; uterus / womb; <u>surrogate</u> (mother);		Max 5
		<b>Total</b>	<b>5</b>

Question number	Answer	Notes	Marks
12 (a)	vessel entering is wider / eq; (increased) <u>pressure</u> ; <u>ultrafiltration</u> ;	ignore thicker ignore references to capillary structure	2
(b)	capillary / capillaries;		1
(c) (i)	active transport / active uptake; low to high concentration / against conc. gradient / eq; energy / ATP;	reject if in list	2
(ii)	respiration;  energy / ATP;  osmotic effect;		Max 2
		<b>Total</b>	<b>7</b>

Question number	Answer	Notes	Marks
13 (a)	right; atrium <u>and</u> ventricle;	allow plural of atria and ventricles	2
(b) (i)	X same <u>and</u> Y up;		1
(ii)	right and left side separate / septum / aorta connected to the left side / no water in LHS / eq;		1
		<b>Total</b>	<b>4</b>



Question number	Answer	Notes	Marks
14	pancreas / Islets of Langerhans / eq; insulin; lower levels; glycogen;		Max 3
		<b>Total</b>	<b>3</b>

Question number	Answer	Notes	Marks
15	C different calcium / range of calcium / eq; O same age / strain / species / gender / eq; R several rats / different groups / eq; M1 mass / eq; M2 one day plus / eq; S1 + S2 same mass food / type of food / diet / water / same cage / temperature / eq;		6
		<b>Total</b>	<b>6</b>
		<b>Total for paper</b>	<b>120</b>



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