

Mark Scheme (Results)

January 2013

International GCSE

Biology (4BI0) Paper 1B

Science Double Award (4SC0) Paper 1B

Edexcel Level 1/Level 2 Certificate

Biology (KBI0) Paper 1B

Science (Double Award) (KSC0) Paper 1B

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Question number	Answer	Notes	Marks
1 (a) (i)	trachea / wind pipe / cartilage; alveoli / alveolus / air sacs;	reject air pockets	2
(b) (i)	X – oxygen / O _{2i} ; Y - carbon dioxide / CO _{2i} ;		2
(ii)	8.4;		1
(iii)	B diffusion;		1
		Total	6

Question number	Answer	Notes	Marks
2	humans / people / farmers / scientists / breeders / eq; characteristics / features / named feature / traits / qualities / eq; offspring / eq; repeated / continued / done / carried on / ongoing / eq;	ignore genes / genetics ignore successful	4
		Total	4

Question number	Answer	Notes	Marks
3 (a) (i)	rice;		1
	(ii) (Asian) toad;		1
(b)	(sun)light; water / rain / moisture / eq; carbon dioxide / CO ₂ ; minerals / ions / nutrients / salts / named mineral / eq; temperature / warmth;	ignore sun alone ignore humidity ignore weather / climate / pollution / global warming / drought / flooding / beetles / insects / pests	2
(c)	kills/destroys/reduce number of/remove beetles/consumers/pests; less rice eaten / eq;	because the beetles feed on the rice = 0 stop beetles eating rice = 1	2

Question number	Answer	Notes	Marks
3 (d)	idea of increasing number of toads/other organism/ predator; eats <u>beetles</u> / eq; OR capture / hunt mongoose / eq; increase toad population / less toads eaten / eq;	reduce the amount of beetles eating rice = 1 introduce predator to control pest = 1	2
		Total	8

Question number	Answer	Notes	Marks
4 (a)	(trap/absorb) light / eq; chlorophyll; photosynthesis / starch / glucose / eq;	ignore trap energy	2
(b)	A cell wall; B vacuole; C cytoplasm;		3
(c) (i)	C; A;		2
(ii)	starch removed / starch used / no starch / eq; (converted to) glucose; respiration / energy;		2
(iii)	boil (in ethanol) / heat (in ethanol)/ eq; ethanol / alcohol; no naked flame / water bath / hot water / in water / eq;	allow water mark if linked to boil / heat	3
(iv)	iodine / iodide;		1
		Total	13

Question number	Answer	Notes	Marks
5 (a)	constipation; lack of <u>water</u> / lots of <u>water</u> absorbed/ drink less <u>water</u> ; lack of fibre / less vegetables / eq;		1
(b)	diarrhoea; less water absorbed; food poisoning / infection / eq;		1
(c)	peristalsis; contraction; muscles; pushed / squeezed / waves / eq;		3
(d) (i)	rectum;		1
(ii)	anus;		1
(e)	faeces versus named excretory product; undigested food versus <u>metabolic</u> waste product; anus versus kidney/lung/skin; not in cells versus in cells;	excretion is removal of faeces from the anus = 0	3
		Total	10

Question number	Answer	Notes	Marks
6 (a)	correct tally 1 mark; (15, 2, 1, 2) correct transfer of tally to number 1 mark;		1 1
(b)	S scale linear on y axis and half grid used on both axes; P bars plotted correctly; A1 axis labelled <u>number</u> ; A2 names of organisms; K key for night and day;		5
(c) (i)	more organisms at night (in total); more woodlice; correct reference to one other organism;		3
(ii)	nocturnal; less predators (at night) / not seen (at night) / less chance of being eaten (at night) / eq; cool (at night) / damp (at night) / eq; less dehydration (at night)/ eq;	allow converse for day ignore safer idea alone	2
(d)	results would be different / inaccurate / changed / described difference / eq; escape; eaten; reproduce / eq;	ignore death	2

Question number	Answer	Notes	Marks
6 (e) (i)	number of named organism / number of <u>an</u> organism / number of <u>a</u> species / eq;	number of organisms = 0 allow amount as eq to number	1
	(ii) different types / different species / different organisms;		1
	(iii) (place) where an organism lives / (place) where organism lives described;		1
		Total	17

Question number	Answer				Notes	Marks																
7 (a)	<table border="1"> <thead> <tr> <th data-bbox="546 292 730 362">Group</th> <th data-bbox="730 292 981 362">Can carry out photosynthesis</th> <th data-bbox="981 292 1245 362">Have a cell wall</th> <th data-bbox="1245 292 1541 362">Can be pathogenic</th> </tr> </thead> <tbody> <tr> <td data-bbox="546 362 730 400">bacteria</td> <td data-bbox="730 362 981 400">✓</td> <td data-bbox="981 362 1245 400">✓</td> <td data-bbox="1245 362 1541 400">✓</td> </tr> <tr> <td data-bbox="546 400 730 438">fungi</td> <td data-bbox="730 400 981 438">X</td> <td data-bbox="981 400 1245 438">✓</td> <td data-bbox="1245 400 1541 438">✓</td> </tr> <tr> <td data-bbox="546 438 730 477">viruses</td> <td data-bbox="730 438 981 477">X</td> <td data-bbox="981 438 1245 477">X</td> <td data-bbox="1245 438 1541 477">✓</td> </tr> </tbody> </table>				Group	Can carry out photosynthesis	Have a cell wall	Can be pathogenic	bacteria	✓	✓	✓	fungi	X	✓	✓	viruses	X	X	✓	hybrid cross tick = 0 blank = 0 8 = 4 7/6 = 3 5/4 = 2 3/2 = 1 1/0 = 0	4
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7 (c)	receptor / nerve ending; sensory neurone / sensory nerve; impulse / message / signal; CNS / spinal cord / grey matter; synapse; relay neurone / relay nerve; motor neurone ; muscle / effector; contract;	sensory or motor not in correct order = 0 ignore brain allow intermediate / association;	5
		Total	13

Question number	Answer	Notes	Marks
8 (a)	purple; (all) offspring are purple / no white;		2
(b)	separate from other flowers / pollen / insects / wind / cover with bag / separate room; transfer pollen by man / brush / eq;		2
(c) (i)	Ff Ff; F f F f; FF and Ff (and Ff) and ff; (allow homozygous dominant / heterozygous / homozygous recessive) purple (purple purple) and white;	allow all marking points in Punnett square allow other letters eg Pp or PW for heterozygote if parents wrong allow ecf	4
(ii)	4.5: 1 / 9:2 / 18:4 / 36:8;	4.5 alone = 0	1
(iii)	role of chance / probability / random (fertilisation); small numbers / eq; more purple pollen involved in fertilisation / eq;		2

Question number	Answer	Notes	Marks
8 (d)	<p>more purple pollen / less white pollen / eq; carried to other (purple) flowers;</p> <p>purple flowers (more likely to) reproduce / eq; allele for purple in passed on in seeds/offspring;</p> <p>more purple flowers; less white flowers;</p> <p>continues over generations / eq;</p>		5
		Total	16

Question number	Answer	Notes	Marks
9	C different temperatures / eq; O same species / size/ age/gender/eq; R repeat / eq; M1 mass / length / number / eq; M2 time period <u>stated</u> ; (one day minimum) S1 and S2 same food type / same food mass / same oxygen / tank size / fish density stated / eq;;		6
		Total	6

Question number	Answer	Notes	Marks																					
10 (a)	<table border="1"> <thead> <tr> <th data-bbox="591 344 954 416">Statement</th> <th data-bbox="954 344 1144 416">Red blood cells</th> <th data-bbox="1144 344 1350 416">White blood cells</th> </tr> </thead> <tbody> <tr> <td data-bbox="591 416 954 456">transport oxygen</td> <td data-bbox="954 416 1144 456">✓</td> <td data-bbox="1144 416 1350 456">✗</td> </tr> <tr> <td data-bbox="591 456 954 496">contain a nucleus</td> <td data-bbox="954 456 1144 496">✗</td> <td data-bbox="1144 456 1350 496">✓;</td> </tr> <tr> <td data-bbox="591 496 954 536">produce antibodies</td> <td data-bbox="954 496 1144 536">✗</td> <td data-bbox="1144 496 1350 536">✓;</td> </tr> <tr> <td data-bbox="591 536 954 576">biconcave shape</td> <td data-bbox="954 536 1144 576">✓</td> <td data-bbox="1144 536 1350 576">✗;</td> </tr> <tr> <td data-bbox="591 576 954 616">ingest pathogens</td> <td data-bbox="954 576 1144 616">✗</td> <td data-bbox="1144 576 1350 616">✓;</td> </tr> <tr> <td data-bbox="591 616 954 711">numbers may increase following infection</td> <td data-bbox="954 616 1144 711">✗</td> <td data-bbox="1144 616 1350 711">✓;</td> </tr> </tbody> </table>	Statement	Red blood cells	White blood cells	transport oxygen	✓	✗	contain a nucleus	✗	✓;	produce antibodies	✗	✓;	biconcave shape	✓	✗;	ingest pathogens	✗	✓;	numbers may increase following infection	✗	✓;	<p>no mark if blank is left</p> <p>no marks for two crosses or two ticks in a row</p> <p>no mark for hybrid tick cross</p>	5
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(b)	<p>more oxygen; haemoglobin; muscles; respiration; (less) anaerobic respiration; (less) lactic acid / (less) oxygen debt / (less) fatigue / (less) cramp; more energy; run faster / run longer / run further / less tired / eq;</p>		4																					

Question number	Answer	Notes	Marks
10 (c)	short race / quick race / short time / short distance / eq; oxygen not needed / no need to breathe / eq; <u>anaerobic</u> respiration;		2
		Total	11

Question number	Answer	Notes	Marks
11 (a)	water / H ₂ O; mineral(s) / ion(s) / salt(s) / named mineral/ion/salt;	ignore sugar / alcohol / hormones	2
(b) (i)	high conc. to low conc. / eq;		1
(ii)	(partially permeable) membrane / small molecules / eq; <u>water</u> ;		1
(iii)	high conc. to low conc. / conc. gradient; partially permeable (membrane/tubing) / eq; diffusion;		2
(iv)	same conc. in fluid and blood / normal blood conc. in fluid / correct glucose conc. in fluid / eq; if high in blood moves out of blood/into fluid; if low in blood moves into blood/out of fluid;		2
(v)	<u>ultrafiltration</u> ; small molecules or named small molecule out of blood / large molecules or protein stay in blood / pressure / Bowman's capsule / glomerulus / eq; (selective) <u>reabsorption</u> ; glucose / ions / amino acids / water; <u>active transport</u> ; glucose / energy / low to high conc. / eq;	mark in pairs – only allow marks from two named processes	4

Question number	Answer	Notes	Marks
11 (c) (i)	<u>renal vein</u> and <u>renal artery</u> ; <u>ureter</u> ;		2
(ii)	nearer to bladder / closer to where waste goes / eq; easier access / closer to surface / eq; ref. to length of tubes/blood vessels /eq;		2
		Total	16

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