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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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January 2013
Publications Code UG034289

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_2; Y - carbon dioxide / CO_2;		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 water / lots of water absorbed/ drink less water; 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 metabolic 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 number; 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 an organism / number of a 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**

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>7 (a)</td><td>
<table>
<tr><th>Group</th><th>Can carry out photosynthesis</th><th>Have a cell wall</th><th>Can be pathogenic</th></tr>
<tr><td>bacteria</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>fungi</td><td>X</td><td>✓</td><td>✓</td></tr>
<tr><td>viruses</td><td>X</td><td>X</td><td>✓</td></tr>
</table>
</td><td>hybrid cross tick = 0

blank = 0

8 = 4
7/6 = 3
5/4 = 2
3/2 = 1
1/0 = 0</td><td>4</td></tr>
<tr><td>(b)</td><td>
<table>
<tr><th>Characteristic</th><th>Example of this process</th></tr>
<tr><td>they require nutrition</td><td>eating food</td></tr>
<tr><td>they respire</td><td>releasing energy from carbohydrate</td></tr>
<tr><td>movement / eq;</td><td>some animals can fly</td></tr>
<tr><td>they control their internal conditions</td><td>blood glucose / blood pressure / body temperature / sweating / osmoregulation / eq;</td></tr>
<tr><td>reproduce / eq;</td><td>increase of the population of foxes</td></tr>
<tr><td>they grow</td><td>cells divide / increase in mass / size / get bigger / increase in height / eq;</td></tr>
</table>
</td><td></td><td>4</td></tr>
</table>

Question number	Answer	Notes	Marks
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)	more purple pollen / less white pollen / eq; carried to other (purple) flowers; purple flowers (more likely to) reproduce / eq; allele for purple in passed on in seeds/offspring; more purple flowers; less white flowers; continues over generations / eq;		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**

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>10 (a)</td><td>
<table>
<tr><th>Statement</th><th>Red blood cells</th><th>White blood cells</th></tr>
<tr><td>transport oxygen</td><td>✓</td><td>X</td></tr>
<tr><td>contain a nucleus</td><td>X</td><td>✓;</td></tr>
<tr><td>produce antibodies</td><td>X</td><td>✓;</td></tr>
<tr><td>biconcave shape</td><td>✓</td><td>X;</td></tr>
<tr><td>ingest pathogens</td><td>X</td><td>✓;</td></tr>
<tr><td>numbers may increase following infection</td><td>X</td><td>✓;</td></tr>
</table>
</td><td>no mark if blank is left

no marks for two crosses or two ticks in a row

no mark for hybrid tick cross</td><td>5</td></tr>
<tr><td>(b)</td><td><u>more</u> 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;</td><td></td><td>4</td></tr>
</table>

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_2O; 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; water;		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)	ultrafiltration; small molecules or named small molecule out of blood / large molecules or protein stay in blood / pressure / Bowman's capsule / glomerulus / eq; (selective) reabsorption; glucose / ions / amino acids / water; active transport; 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)	renal vein and renal artery; ureter;		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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Order Code UG034289 January 2013

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