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Mark Scheme (Results)

Summer 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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<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>1 (a)</td><td>
<table>
<tr><th>Sentence</th><th>Number</th></tr>
<tr><td>the number of animals is</td><td>(8)</td></tr>
<tr><td>the number of producers is</td><td>1;</td></tr>
<tr><td>the number of herbivores is</td><td>4;</td></tr>
<tr><td>the number of secondary consumers is</td><td>4;</td></tr>
<tr><td>the number of food chains is</td><td>6;</td></tr>
</table>
</td><td></td><td>4</td></tr>
</table>

Question number	Answer	Notes	Marks
1 (b) (i)	decrease / eq;	allow have a negative effect	1
(ii)	number of <u>same</u> <u>species</u> / number of <u>a</u> <u>species</u> / number of <u>one</u> <u>species</u> / eq;	allow amount / how many as eq to number	1
(c)	carbohydrate / glucose; protein / amino acids; fat / fatty acids / glycerol / cholesterol/ lipid; mineral / ions / salt / named mineral / named ion / named salt; vitamin / named vitamin; water;	ignore other blood components such as haemoglobin, rbc, platelets, oxygen and sugar etc	2
		Total	**8**

Question number	Answer	Notes	Marks
2 (a)	thick(er) <u>wall</u>; more elastic (tissue); more muscle (tissue); smaller lumen / hole / less space / less single layer of cells / eq; no valves;	ignore references to function ignore smaller diameter / less surface area unless qualified allow converse	Max 3
(b) (i)	(less/no) muscle(s); <u>contract</u>ion; squeeze vein / push blood / eq;		Max 2
(ii)	red (blood cells) / erythrocytes;		1
(iii)	(less/no) oxygen / oxygenated blood; heart / brain / organ / body / cells / tissues / eq; <u>respiration</u> / <u>respire</u> / <u>respiring</u>;	ignore gas exchange	2
		Total	**8**

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>3</td><td>
<table>
<tr><th>Health problem</th><th>Cause</th><th>Label letter</th></tr>
<tr><td>conjunctivitis</td><td>infection of the conjunctiva</td><td>(A)</td></tr>
<tr><td>cataract</td><td>a cloudy lens</td><td>B;</td></tr>
<tr><td>blindness</td><td>a detached retina</td><td>G;</td></tr>
<tr><td>glaucoma</td><td>increased fluid pressure</td><td>F;</td></tr>
<tr><td>myopia</td><td>a change in the shape of the cornea</td><td>D;</td></tr>
</table>
</td><td></td><td>4</td></tr>
<tr><td></td><td></td><td>Total</td><td>4</td></tr>
</table>

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>4 (a)</td><td>
<table>
<tr><th>genotype</th><th>description of genotype</th><th>phenotype</th></tr>
<tr><td>(LL)</td><td>(homozygous dominant)</td><td>long winged</td></tr>
<tr><td>(Ll)</td><td>(heterozygous)</td><td>long winged;</td></tr>
<tr><td>ll;</td><td><u>homozygous recessive</u>;</td><td>(short winged)</td></tr>
</table>
</td><td>long winged x 2 = 1 mark</td><td>3</td></tr>
<tr><td>(b)</td><td>
<table>
<tr><th>number</th><th>tick</th></tr>
<tr><td>204</td><td></td></tr>
<tr><td>408</td><td>✓</td></tr>
<tr><td>612</td><td></td></tr>
<tr><td>816</td><td></td></tr>
</table>
</td><td>more than one tick = 0</td><td>1</td></tr>
</table>

Question number	Answer	Notes	Marks
4 (c)	fruit → yeast → flies; arrows used and correct;	yeast in middle =1	2
(d) (i)	type of fruit / eq; mass/amount of fruit / eq; gender / species / type / size of fly; temperature; light; humidity;	ignore number of flies / time	max 2
(ii)	(no) not repeated / only done once / use more flies / eq; (yes) used lots of flies;		1
		Total	**9**

Question number	Answer	Notes	Marks
5 (a)	(more) oxygen / prevent stagnation / eq ; bubbling / paddles / pump / eq; add water plants; remove waste / remove faeces / remove dead fish / remove leaves / eq; prevent eutrophication / don't fertilise nearby fields / prevent algal growth / eq:	ignore ref to temperature / killing bacteria / adding pesticides / adding antibiotics ignore monitoring ignore cleaning	Max 2
(b)	separate species / type / sizes / ages / eq; cover / net / fence / cage / eq; scarecrow / shoot predators / shoot birds / eq;	ignore ref to lice and biological control	Max 2
(c)	antibiotics; fungicide; (kill) bacteria / fungi; remove dead fish / remove diseased fish / eq; reduce numbers / do not overcrowd / eq; use resistant strains / eq; keep out wild fish / eq;	ignore uv radiation ignore pesticide ignore ref to lice and biological control	Max 2
(d)	small quantities / eq; frequently / often / several times a day / eq; high protein; remove waste food; less bacterial growth;	ignore regular	Max 2
		Total	**8**

Question number	Answer	Notes	Marks
6 (a)	movement of particles / ions / molecules / gas / eq; high to low concentration / down gradient / eq;	allow ammonia ignore substance ignore along gradient	2
(b)	S scale linear and half grid; L lines straight and through points; A axes correct way around; P points plotted correctly; U units: <u>s</u> / <u>seconds</u> and <u>cm</u>; K key to note <u>1</u> and <u>3</u> (drops);	ignore extrapolation one line only loses L and P and K allow start at origin if start at 4 and not 0 if bar graph 4 max (lose S and L)	6
(c)	faster/quicker (colour change/movement/diffusion /spread); (with) high conc. / 3 drops;	Allow converse	2
(d)	1.176 / 1.18;;	allow one mark for 20 over 17 ignore 1.2 ignore 1.17	2
(e)	(3 drops) more concentrated/more ammonia/more particles/greater concentration gradient/greater diffusion gradient / eq;	allow converse	1
(f)	use one conc. / same number of drops / eq; different temperatures / method to obtain different temperatures described /eq;	set up the (same) experiment at different temps = 1 mark	2
		Total	**15**

Question number	Answer	Notes	Marks
7	dioxide; acid; carbon; haemoglobin; carbon dioxide / water vapour; fossil; methane; greenhouse; global warming; habitat;	ignore climate change	10
		Total	**10**

Question number	Answer	Notes	Marks
8 (a)	1 (feed on) dead / rotting / decomposing / eq; 2 enzyme(s); 3 extracellular / outside / external / eq; 4 digests / digestion / digestive; 5 absorption / eq;		max 2
(b) (i)	D;		1
(ii)	B;		1
(c) (i)	chlorophyll;	ignore chloroplasts	1
(ii)	carbon dioxide + water; glucose + oxygen;	ignore light / ignore chlorophyll ignore energy allow if correct symbols and correct formulae ignore balancing	2
		Total	**7**

Question number	Answer	Notes	Marks
9	1 <u>variation / variety;</u> 2 rare / random; 3 mutation / mutant; 4 gene / allele / DNA / eq; 5 survive / not killed / live / eq; 6 reproduce / breed / have offspring / eq; 7 pass on (gene) / eq; 8 many generations / repeated over time / eq;	 allow converse for non-resistant ignore pass on phenotype / characteristic	Max 5
		Total	**5**

Question number	Answer	Notes	Marks
10 (a)	potometer;		1
(b)	transpiration / evaporation / diffusion;		1
(c)	1 cut under water; 2 water tight / air tight / seal / eq; 3 how bubble introduced; 4 dry leaves / eq; 5 measure distance bubble moves / length of bubble eq; 6 scale / ruler / cm / eq; 7 time / second / minute / hour / day; 8 repeat;		Max 4
(d) (i)	blows water away / removes water / eq; (maintains) diffusion gradient / conc. gradient / eq;		2
(ii)	stomata close / pores close;	ignore guard cells	1
(iii)	less surface / area; (fewer) idea of reduced number of stomata / pores;		2
(e)	fan / hairdryer / outdoors / put in a draught / put in open window / eq;		1
		Total	**12**

Question number	Answer	Notes	Marks
11 (a)	23;	reject 23 pairs	1
(b)	energy / ATP; swim / move / move tail / travel / eq;		2
(c)	24 million / 24,000,000;;	allow one for 60 in working	2
(d) (i)	(not) using oxygen / oxygen still present; (not) respiring; few sperm / eq; poor swimmers / eq;	ignore man infertile ignore dead sperm	2
(ii)	1 seal broken / oxygen getting in / not airtight / eq; 2 (semen) sample too small; 3 kept less than one hour / eq; 4 not kept at 37^0C / not at correct temperature eq; 5 only done once / anomalous result / eq;	ignore sperm reject idea that 37^0C kills	max 2
		Total	**9**

Question number	Answer	Notes	Marks
12 (a) (i)	cell <u>membrane</u>; nucleus (must be lobed); cytoplasm;	ignore shape of cell must be labelled if cell wall no credit for membrane	3
(ii)	nucleus / bigger / irregular / not (bi)concave / eq / no haemoglobin;	allow converse	1
(b)	1 ingest / engulf / surround / phagocytosis / eq; 2 enzymes; 3 digest / breakdown / eq; 4 lymphocytes; 5 antibodies / antitoxins; 6 specific / eq; 7 antigen: 8 memory / memory cell / eq;		Max 5
		Total	**9**

Question number	Answer	Notes	Marks
13 (a)	1 human gene / human DNA / human allele; 2 restriction enzyme; 3 plasmid; 4 vector; 5 same restriction enzyme; 6 ligase; 7 recombinant plasmid / recombinant DNA;	allow gene that codes for growth hormone	Max 5
(b) (i)	released from gland / endocrine; travels in blood; to target (cells/organs) / eq; effect / response / coordination / controls / causes change / eq;	allow described effect	2
(ii)	1 cow with high milk yield / eq; 2 male/bull with high milk yield daughters or high milk yield mother / eq; 3 reproduce / mate / breed / AI / eq; 4 repeat process with high milk yield offspring / many generations / eq;	cows with high yield milk are allowed to reproduce = 2 use sperm from bull	Max 3
		Total	**10**

Question number	Answer	Notes	Marks
14	C different light periods / eq; O same species / same variety / age / eq; R repeat / eq; M1 time to produce flowers / number of flowers produced / how long to produce flowers / eq; M2 days / weeks / months / use watch / clock / eq; S1+S2 same temperature / light <u>intensity</u> / CO_2 / water/ humidity / minerals / nutrients / soil / pH / eq;;	allow in light and in dark ignore different light intensities allow flowers as eq to plants	Max 6
		Total	**6**
		Total for paper	**120**

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