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Mark Scheme (Results)

January 2012

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

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INTERNATIONAL GCSE BIOLOGY 4BI0 4SC0 /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; only DNA / only 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)	genes / alleles / eq; inherited / passed on / eq; parent/offspring height described; reduce growth; <u>compete</u>; light / minerals / water / carbon dioxide / eq;	 eg tall / short / big / small / high / low allow nutrients / moisture	max 2
(ii)	improve growth; decomposition / decomposers / eq; minerals / named mineral / nutrient / salts / ions / ammonium / nitrogen fixing / nitrifying; or reduce growth; infection / disease / attack / harm / eq; pathogen;	 ignore nitrogen ignore use nutrients	max 2
(b) (i)	unwanted plant / of no use / described reason for not wanted / eq;		1
(ii)	(less) <u>competition</u>; light; carbon dioxide; water; minerals / nutrients / salts / ions / eq;	ignore space	max 2
(iii)	herbicide / weedkiller / chemical that kills / pesticide / eq; pull them up / eq;		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) (ii)	10 male and 12 female; tube 4 at 35°C;		1 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)	small surface area to volume (ratio); less heat loss / less energy loss maintain body temp. / keep warm / fat insulation / eq;	allow small surface area to mass (ratio)	2
(b)	insulation / insulator / insulated; 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; contract; 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

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>6 (a)</td><td>
<table>
<tr><th>Illness</th><th>Organ needed to cure illness</th></tr>
<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>
</table>
</td><td></td><td>5</td></tr>
<tr><td>(b)</td><td>bile;
emulsifies / large drops to small drops / eq;
neutralise / optimum pH / alkaline;</td><td></td><td>2</td></tr>
<tr><td>(c) (i)</td><td>genetically / gene / allele / DNA;
identical / same / eq;</td><td>ignore similar</td><td>2</td></tr>
<tr><td>(ii)</td><td>lots / no shortage / no delay / better supply / always available / eq;

no rejection / match / accepted by body / eq;

no problems with relatives / eq;</td><td>allow ref to blood type</td><td>2</td></tr>
</table>

TOTAL 11 MARKS

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>7 (a) (i)

(ii)</td><td>9.8(03922%);;
allow one for 0.51 in working

different masses / different sizes / <u>valid</u> comparison;</td><td></td><td>2

1</td></tr>
<tr><td>(b)</td><td>water <u>enters</u> / water <u>in</u> / eq;
dilute to more concentrated solution / eq;
partially permeable membrane / eq;</td><td>interpret the term concentration alone as being water molecules</td><td>3</td></tr>
<tr><td>7 (c)</td><td><table><tr><th>Cube of side in cm</th><th>SA in cm^2</th><th>Volume in cm^3</th><th>SA/Vol ratio</th></tr><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></table></td><td>one mark for each pair</td><td>3</td></tr>
<tr><td>(d)</td><td>more osmosis / faster (small cubes) / greater % increase / greater % change / eq;

larger SA:Vol ratio (of small cubes);</td><td>allow converse</td><td>max 2</td></tr>
<tr><td>(e)</td><td>cell wall;
cell membrane;
cytoplasm;
vacuole;
nucleus;
chloroplast;</td><td>5 to 6 = 3
3 to 4 = 2
1 to 2 = 1</td><td>max 3</td></tr>
</table>

TOTAL 14 MARKS

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>8 (a)</td><td><table><tr><th>Order</th><th>Name of stage</th></tr><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></table></td><td>1 mark for gametes
1 mark for baby
2 marks for zef

1 mark for zfe or ezf or fez</td><td>4</td></tr>
<tr><td>(b) (i)</td><td>connection between <u>atria</u> / eq;
connection between arteries / pulmonary artery and aorta;</td><td></td><td>2</td></tr>
<tr><td>8 (c) (i)</td><td>XY;</td><td></td><td>1</td></tr>
<tr><td>(ii)</td><td>46 or 23 <u>pairs</u></td><td></td><td>1</td></tr>
</table>

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

TOTAL 11 MARKS

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

TOTAL 5 MARKS

Question number	Answer	Notes	Marks
12	C noise and no noise / range of noise; O same species / mass / seeds / amount of crop / eq; R replication evident; M1 mass eaten / number eaten / count birds / eq; M2 time period stated; S1 weather / season / temperature/ wind / same time of day / eq; S2 same number/ species of bird / same area / field size / quadrat / eq;	 allow amount / how much / how many allow temperature if in field ignore same field	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	control intraspecific predation / control overcrowding / separate sizes / separate ages / eq; control interspecific predation / killing predators; control disease / infection; antibiotics / remove dead fish; biological control of pests / eq; control oxygen; remove waste products; frequent feeding / feed small amounts; (high) <u>protein</u> diet; selective breeding / eq; hormones;	ignore clean water	max 6

TOTAL 6 MARKS

PAPER TOTAL: 120 MARKS

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