

# Mark Scheme (Results)

January 2013

International GCSE  
Biology (4BI0) Paper 2B

Edexcel Level 1/Level 2 Certificate  
Biology (KBI0) Paper 2B

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Question number	Answer	Notes	Marks
1 (a)	DNA / part of a chromosome / eq;  codes for protein / makes protein / determines characteristic / determines named characteristic / eq;		2
(b)	(release/ produce) lots of eggs / more eggs / ovulate more / eq;	need idea of larger quantity	1
(c)	uterus / womb;		1
(d)	smoking / (having) cigarette / (having) tobacco;		1
(e)	<u>50</u> (%);		1
(f) (i)	protein/blood clotting factor digested/destroyed (by acid) / eq;	allow broken down ignore need to separate from milk ignore sugar	1
(f) (ii)	glucose; (more) respiration / energy / ATP; milk / meat production / growth / eq;		2
(g)	<u>transplant</u> / <u>transplantation</u> ;  (more) hearts available / less shortage / less waiting time / no need for donors / few donors / lowers demand / eq;  less immune response / less rejection / human proteins / human DNA / human genes / tissue type / better match / compatible / eq;  less deaths / live longer / eq;	ignore work for longer / reduce heart attacks	3
		Total	12

Question number	Answer	Notes	Marks										
2 (a)	120 to 136;; within range of 60 to 68 = 1 an indication of times 2 = 1	any number in working times 2 = 1 eg. 50 x 2 = 100 gets one mark	1										
(b)	0.00138 / 0.0014 / $1.38 \times 10^{-3}$ ;;  allow one mark for 0.2/6 or 0.03(3) or 0.2/24 or 0.008 in working		2										
(c)	surface (area) covered or exposed / side of leaf covered or exposed / place where jelly put / eq;	ignore quantity of jelly	1										
(d)	(loss of) mass / weight;		1										
(e)	light / wind / humidity / temperature / time / species / eq;		1										
(f) (i)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Mass lost</th> <th>Leaf</th> </tr> </thead> <tbody> <tr> <td>Most</td> <td>A</td> </tr> <tr> <td></td> <td>C</td> </tr> <tr> <td></td> <td>B</td> </tr> <tr> <td>Least</td> <td>D;;</td> </tr> </tbody> </table>	Mass lost	Leaf	Most	A		C		B	Least	D;;	if wrong order then allow one mark for A before D OR C before B	2
Mass lost	Leaf												
Most	A												
	C												
	B												
Least	D;;												
(ii)	stomata;  (more) on lower surface / (fewer) on upper surface / eq;  A no surface covered most mass lost / water lost C upper surface covered next most mass/water lost B lower surface covered less mass / water lost D both surfaces covered least mass / water lost sensible link between leaf coverage and loss of mass/water;	ignore guard cells  allow converse between surface exposed and mass lost	3										
		Total	12										

Question number	Answer	Notes	Marks
3 (a)	temperature recorder / eq; cooling jacket / cooling water / water in if hot / eq;		2
(b)	respiration produces heat; enzymes; denatured / destroyed / eq; optimum; best growth / maximum growth / more product / eq; microorganisms killed / eq;		2
(c)	mixing / distributing oxygen / air; for respiration;  mixing / distributing nutrients / microorganisms; for growth;  mixing / distributing heat / temperature; for respiration / enzymes;	mix air and heat = 2	2
(d)	pH / acidity / alkalinity; <u>enzymes</u> ;  oxygen; <u>respiration</u> ;  (other) microorganisms / sterility; competition / contamination / less product / eq;	mark in discrete pairs  ignore air	2
(e)	insulin / penicillin / antibiotic / <i>Fusarium</i> / mycoprotein / any named GM product / eq;	ignore bacteria / fungus / cheese / yoghurt / beer / ethanol / medicine	1
		Total	9

Question number	Answer	Notes	Marks
4 (a) (i)	B;		1
(ii)	A;		1
(iii)	C;		1
(b) (i)	zygote;		1
(ii)	mitosis ;		1
(iii)	diploid with 46 chromosomes;	ignore tick cross hybrid two ticks present = 0	1
(c)	placenta;  from mother's blood;  diffusion / high conc. to low conc.;  large surface area / thin / eq;  <u>umbilical</u> cord;	ignore gas exchange / ignore carried	3
		Total	9

Question number	Answer	Notes	Marks
5 (a)	cell membrane; cytoplasm; plasmid; nucleoid / chromosome / DNA once;	reject nucleus / nucleolus ignore vacuole / ribosomes / mitochondria	3
(b) (i)	enzymes; <u>optimum</u> ; denatured / destroyed / eq;	ignore references to low pH and high pH	2
(ii)	amino acids; protein / DNA;		2
(iii)	active transport / active uptake; low to high conc. / against conc. gradient / eq; respiration / energy / ATP;  root <u>hair</u> (cells); large surface area / eq;		3
(c) (i)	X at 100;	allow any indication at 100	1
(ii)	11.1%;; allow one mark for 8000 or 7200 or 800 in working		2
(iii)	nitrate (already) in soil / <u>nitrogen fixing</u> bacteria / nitrification / organic material in soil / eq;		1
		Total	15

Question number	Answer	Notes	Marks
6 (a)	smaller surface area to volume ratio; less heat loss / more energy measured / eq; heats up slowly / avoid boiling / eq;	accept converse	2
(b)	insulation / lid / cover / eq; less heat/energy loss; burning food close to tube / eq; less heat/energy loss; quick transfer of burning food / eq; less heat/energy loss; stir / eq; even temperature; avoid draft / wind; less heat/energy loss; digital thermometer ; precision / eq; use calorimeter / burn in oxygen; all food burnt / less heat/energy loss;	mark in discrete pairs reject idea of more bread ignore repeat	2
		Total	4



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