

Mark Scheme (Results)

Summer 2010

IGCSE

IGCSE Science (Double Award) (4437) Paper 4H

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IGCSE SCIENCE DOUBLE AWARD 4437/4H - SUMMER 2010

Question Number	Answer	Mark
1(a)(i)	A cell membrane controls what enters/leaves the cell / permeability / holds cell contents / engulf / eq; B cytoplasm (chemical) reactions / respiration / metabolism / synthesis / enzymes / eq; C nucleus; controls (cell activity) / contains DNA/genetic material / eq; Ignore brain	(4)

Question Number	Answer	Mark
1(a)(ii)	digestion / breakdown; Ignore destroyed / killed / dissolves / eq; enzymes;	(2)

Question Number	Answer	Mark
1(b)	lymphocytes / memory cell / plasma cell; antibodies / antitoxins; clump bacteria/pathogen/microorganism / neutralise / eq; Ignore kill/destroy	max (2)

Question Number	Answer			Mark																					
2	<table border="1"> <thead> <tr> <th data-bbox="328 331 528 432">condition</th> <th data-bbox="528 331 847 432">symptom</th> <th data-bbox="847 331 1238 432">organ affected</th> </tr> </thead> <tbody> <tr> <td data-bbox="328 432 528 539">emphysema</td> <td data-bbox="528 432 847 539">poor gas exchange</td> <td data-bbox="847 432 1238 539">lung;</td> </tr> <tr> <td data-bbox="328 539 528 640">cataract</td> <td data-bbox="528 539 847 640">cloudy lens</td> <td data-bbox="847 539 1238 640">eye;</td> </tr> <tr> <td data-bbox="328 640 528 741">Alzheimer's</td> <td data-bbox="528 640 847 741">loss of memory</td> <td data-bbox="847 640 1238 741">brain / CNS;</td> </tr> <tr> <td data-bbox="328 741 528 880">coeliac</td> <td data-bbox="528 741 847 880">poor food absorption</td> <td data-bbox="847 741 1238 880">(small) intestine / duodenum / ileum; Ignore gut / large intestine</td> </tr> <tr> <td data-bbox="328 880 528 981">arthritis</td> <td data-bbox="528 880 847 981">swollen joints</td> <td data-bbox="847 880 1238 981">(bones)</td> </tr> <tr> <td data-bbox="328 981 528 1088">infertility</td> <td data-bbox="528 981 847 1088">lack of sperm</td> <td data-bbox="847 981 1238 1088">testis / eq;</td> </tr> </tbody> </table>			condition	symptom	organ affected	emphysema	poor gas exchange	lung;	cataract	cloudy lens	eye;	Alzheimer's	loss of memory	brain / CNS;	coeliac	poor food absorption	(small) intestine / duodenum / ileum; Ignore gut / large intestine	arthritis	swollen joints	(bones)	infertility	lack of sperm	testis / eq;	(5)
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Question Number	Answer	Mark
5(a)	<p>Aa Aa;</p> <p>A a A a;</p> <p>AA Aa Aa aa;</p> <p>brown brown brown albino / 3 brown + 1 albino; allow normal as eq to brown</p> <p>Ignore not albino Ignore genotype descriptions</p>	(4)

Question Number	Answer	Mark										
5(b)(i)	<table border="1"> <thead> <tr> <th>parent genotypes</th> <th>number of albino offspring</th> </tr> </thead> <tbody> <tr> <td>homozygous dominant x homozygous dominant</td> <td>(none)</td> </tr> <tr> <td>heterozygous x homozygous recessive</td> <td>two / 2;</td> </tr> <tr> <td>heterozygous x heterozygous</td> <td>one / 1;</td> </tr> <tr> <td>homozygous recessive x homozygous recessive</td> <td>four / 4 / all;</td> </tr> </tbody> </table>	parent genotypes	number of albino offspring	homozygous dominant x homozygous dominant	(none)	heterozygous x homozygous recessive	two / 2;	heterozygous x heterozygous	one / 1;	homozygous recessive x homozygous recessive	four / 4 / all;	(3)
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5(b)(ii)	<p>easily seen / not camouflaged / cannot hide / eq; predators / eaten / killed / do not survive / selected against / eq; less chance of mating / eq; allow converse</p>	<p>max</p> <p>(2)</p>

Question Number	Answer	Mark
7	<p>(control) diet / quality / frequency; (control) water quality / oxygen / temperature / waste / eq; (control) predation / nets / eq; (control) disease / parasites / antibiotics / pathogens; Ignore healthier fish</p> <p>selected species / strain / mass / guarantee quality / less variation / eq; Ignore more fish produced</p> <p>no need for boats / easier to catch / guaranteed harvest / eq;</p> <p>less depletion of (wild) fish / less overfishing / no risk of catching other species / eq;</p>	<p>max</p> <p>(4)</p>

Question Number	Answer	Mark
8	<p><u>vasodilation</u>; arterioles; (blood vessels) dilate / get wider / eq; (more) blood to skin / surface;</p> <p>(more) <u>sweat</u>; (more) evaporation / water loss / eq;</p> <p>hair; (erector) muscles relax; (hair) flat / eq; (less) air trapped / less insulation / eq;</p> <p>cooling / heat loss / radiation / convection / eq;</p> <p>allow converse</p>	<p>max</p> <p>(6)</p>

Question Number	Answer	Mark
9(a)	single cell / one cell;	(1)

Question Number	Answer	Mark
9(b)(i)	small / microscopic / short distance; <u>large SA/vol ratio</u> ; diffusion;	max (2)

Question Number	Answer	Mark																		
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Question Number	Answer	Mark
10(a)(i)	python;	(1)

Question Number	Answer	Mark
10(a)(ii)	mongoose;	(1)

Question Number	Answer	Mark
10(b)(i)	reduce beetles / eat beetles / reduce pest / kill beetles / eq; increase (sugar cane) crop / stop beetles eating sugar cane / eq; reduce beetles that eat sugar cane = 2 because beetles eat sugar cane = 1	(2)

Question Number	Answer	Mark
10(b)(ii)	increase in number / reproduce / eq; eat other organisms / disrupt food chains / not enough beetles for other species to eat / eq; Ignore idea that more beetles eaten	(2)

Question Number	Answer	Mark
11(a)(i)	excretory / urinary / urinogenital / osmoregulatory / eq;	(1)

Question Number	Answer	Mark
11(a)(ii)	C bladder; B ureter; A urethra;	(3)

Question Number	Answer	Mark
11(b)	semen; Ignore sperm urine;	(2)

Question Number	Answer	Mark
11(c)	unwilling to donate / eq; need correct match / antigens / eq; allow ref to blood groups	(2)

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12(a)	<table border="1"> <thead> <tr> <th>Name of component</th> <th>Source</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>carbohydrate / starch; Ignore glucose and sugar</td> <td>pasta</td> <td>energy source</td> </tr> <tr> <td>Lipid</td> <td>fish</td> <td>energy / insulation / eq;</td> </tr> <tr> <td>protein;</td> <td>meat</td> <td>synthesis of enzymes</td> </tr> <tr> <td>iron</td> <td>red meat</td> <td>haemoglobin / red (blood) cells;</td> </tr> </tbody> </table>	Name of component	Source	Function	carbohydrate / starch; Ignore glucose and sugar	pasta	energy source	Lipid	fish	energy / insulation / eq;	protein;	meat	synthesis of enzymes	iron	red meat	haemoglobin / red (blood) cells;	(4)
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Question Number	Answer	Mark
12(b)(i)	C H O / carbon + hydrogen + oxygen;	(1)

Question Number	Answer	Mark
12(b)(ii)	lipase; fatty acids / glycerol; bile; emulsification / large drops to small drops / increase surface area / optimum pH / neutralises acid;	max (3)

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PAPER TOTAL: 90 MARKS

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