

Mark Scheme (Results)

Summer 2012

International GCSE

Human Biology (4HB0) Paper 02

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Publications Code UG032510

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INTERNATIONAL GCSE HUMAN BIOLOGY PAPER 02 – SUMMER 2012

Question number	Answer	Notes	Marks
1 (a) (i)	A = myelin sheath; B = dendrites; C = cell body/cytoplasm; D = node of Ranvier;		4
(ii)	motor;		1
(iii)	arrow pointing away from cell body;		1
(iv)	sensory; relay/intermediate;		2
(b)	protective; fast; Involuntary/automatic/not controlled by brain;		2 max

Total 10 marks

Question number	Answer	Notes	Marks
2 (a) (i)	only small numbers of bacteria taken in; need to multiply/reproduce; time taken for bacteria/food to pass along gut;		2 max
	(ii) bacteria produce toxins; affect gut (lining); make it permeable to fluids/loss of fluids from blood;		2 max
(b) (i)	hands covered in bacteria/washing removes bacteria; can't be transferred to food;		2
	(ii) bacterial reproduction slowed; less bacteria to cause food poisoning/enzymes/chemical reactions slower;	Reject stopped	2
	(iii) meat can contain bacteria; if stored higher blood/juices/liquid could drip onto/contaminate other food;		2

Total 10 marks

Question number	Answer	Notes	Marks
3 (a)	(i) start as a single bacterium; multiply/divide many times/large number produced; by mitosis/binary fission; feed on nutrients/agar;		2 max
	(ii) if not sterile would contain bacteria; these would affect result/bacteria enters from outside;		2
	(iii) distribute milk evenly/spread milk;		1
	(iv) prevents lid from coming off/stops other bacteria entering;		1
	(v) too many colonies otherwise/stop colonies merging/so colonies can be counted;	must be reference to colonies.	1
(b)	(i) dish 1 = 24; dish 2 = 25; dish 4 = 26;		3
	(ii) mean figure for dish is 25; dilution is $200/2 \times 200$; $25 \times 200 = 5000$;		3
	(iii) can't tell/count how many colonies present; couldn't determine (original) numbers of bacteria that produce colonies;	Accept OWTTE	2

Total 15 marks

Question number	Answer	Notes	Marks
4 (a)	supplies blood/oxygen/nutrients to heart <u>muscle</u> ;		1
(b) (i)	cholesterol/fat /lipid/triglyceride;		1
(ii)	high (blood) cholesterol/ <u>saturated</u> fat levels; high blood pressure; lack of exercise; overweight; smoking; stress; hereditary factors;		2 max
(iii)	blood flow slows/stops in vessel; less/no oxygen/glucose to heart muscle; heart <u>muscle</u> dies/stops functioning; heart attack;		3 max

Total 7 marks

Question number	Answer	Notes	Marks
5 (a) (i)	no readings between pH 3.25 and 4.3; rate may go up after 3,25; so optimum would be higher;		3
(ii)	stomach; low pH/acidic/HCl present/ enzyme has low optimum pH;		2
(b)	denatured; as high pH breaks bonds; changes shape of active site; substrate unable to enter active site/form enzyme-substrate complexes;		3 max

Total 8 marks

Question number	Answer	Accept	Marks
6 (a) (i)	Mother $I^A I^O$ Child $I^O I^O$;		1
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>(mother)</p> <p>$I^A I^O$</p> </div> <div style="text-align: center;"> <p>(father)</p> <p>$I^A I^B$</p> </div> </div> <p>gametes I^A I^O I^A I^B;</p> <p>offspring I^O;</p> <p> $I^A I^A$ $I^A I^B$ $I^A I^O$ $I^B I^O$</p> <p>blood group A AB A</p> <p>B;</p>	child is homozygous; child must inherit I^O from each parent ; Father has $I^A I^B$ / has no I^O ;	3
6 (b)	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>(mother)</p> <p>$I^A I^O$</p> </div> <div style="text-align: center;"> <p>(father)</p> <p>$I^B I^O$;</p> </div> </div> <p>gametes I^A I^O I^B I^O;</p> <p>offspring I^O;</p> <p> $I^A I^B$ $I^A I^O$ $I^B I^O$ $I^O I^O$</p> <p>blood group AB A B</p> <p>O;</p>		
6 (c)	reference to rejection; doesn't clump/agglutinate; otherwise vessels blocked; no/less oxygen transported;		2 max

Total 10 marks

PAPER TOTAL: 60 MARKS

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