



Mark Scheme (Results)

Summer 2012

International GCSE

Human Biology (4HB0) Paper 02

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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
		(ii)		(mother) $I^A I^O$		(father) $I^A I^B$	child is homozygous; child must inherit I^O from each parent ; Father has $I^A I^B$ / has no I^O ;	3
	(b)		gametes	I^A I^O		I^A I^B ;		
			offspring I^O ;	$I^A I^A$	$I^A I^B$	$I^A I^O$	I^B	
6	(c)		blood group B;	A	AB	A		
				(mother) $I^A I^O$		(father) $I^B I^O$;		
	(c)		gametes	I^A I^O		I^B I^O ;		
			offspring I^O ;	$I^A I^B$	$I^A I^O$	$I^B I^O$	I^O	4
6	(c)		blood group O;	AB	A	B		
			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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