



General Certificate of Education

Biology 2410

BIOL1 Biology and disease

Mark Scheme

2009 examination - January series

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Question	Part	Sub Part	Marking Guidance	Mark	Comments
1	(a)	(i)	Cholesterol/ lipoprotein/ fatty material/cells; In the artery wall/under lining/endothelium of artery/blood vessel;	2	Reject fatty acid Q Do not accept references to veins or capillaries as equivalent to blood vessels
1	(a)	(ii)	(Trapped in) coronary artery/artery supplying heart muscle/ tissue/cells; Prevents oxygen; Reaching (heart muscle/tissue); (Heart muscle) dies/stops respiring;	3 max	i.e. material of heart wall
1	(b)	(i)	Allows comparison; Different number of people in each country;	2	
1	(b)	(ii)	Correlation does not show causation / graph only shows correlation Something else/another named factor may be involved such as lack of fibre/smoking/stress;; Related to both CHD and dairy fat;	2 max	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
2	(a)	(i)	Glucose; Fructose;	2	Any order.
2	(a)	(ii)	Lactose has a different shape/structure; Does not fit/bind to active site of enzyme/sucrase; OR Active site of enzyme/sucrase has a specific shape/structure; Does not fit/bind to lactose;	2	Only allow a second mark if reference is made to the active site. Max 1 mark if active site is described as being on the substrate. Do not accept same shape.
2	(b)	(i)	Rose and fell; Peak at 45 (minutes) / concentration of $6.6 \text{ (mmol dm}^{-3}\text{)}$;	2	
2	(b)	(ii)	Glucose (produced by digestion) is absorbed / enters blood; Decrease as used up/stored;	2	
2	(b)	(iii)	Curve roughly parallel to the x-axis or falling, starting from approximately the same point;	1	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
3	(a)		Lengthways/down the root; Through one tissue only / through same part / same proportion of tissues;	2	
3	(b)		To prevent the water from evaporating / prevent evapoaration; Changing the concentrations / water potential (of solution);	2	
3	(c)	(i)	Plot data on a graph; Find (sucrose concentration) from the graph where the ratio is 1;	2	
3	(c)	(ii)	No, because the results are given as a ratio/as a proportion of initial length;	1	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
4	(a)		Two marks for a correct answer of 0.1s;; One mark for an incorrect answer where attempt has been made to divide distance by rate of blood flow;	2	Q Other answers can be accepted if distance clearly estimated as differing from 20µm. Credit is for method, not measuring ability. Mark can only be awarded if approach is clearly shown
4	(b)	(i)	Replaces it with blood with a low oxygen concentration / removes blood with high oxygen concentration;	1	
4	(b)	(ii)	Asthma attack narrows airways; Air in <u>alveoli</u> not replaced (as efficiently) /less air/oxygen to alveoli; Difference in concentration lower so rate of diffusion lower;	2 max	Ignore trachea and aveoli
4	(c)	(i)	To make sure that nothing else might have produced the results / that patients didn't improve anyway /to allow comparison (with expt group);	1	
4	(c)	(ii)	Inhaler with dummy drug / placebo / with old drug / with no drug; Otherwise treated exactly the same;	2	Q No need for phrase "dummy drug" as long as idea conveyed.

Question	Part	Sub Part	Marking Guidance	Mark	Comments
5	(a)		Phagocytes engulf pathogens/microorganisms; Enclosed in a vacuole / vesicle/ phagosome; Lysosomes have enzymes; That digest/hydrolyse molecules/proteins/lipids/ microorganism;	3 max	
5	(b)	(i)	Get another strain / there are different strains; Therefore does not have memory cells against second strain;	2	Q The second marking point should only be awarded in the context of memory cells.
5	(b)	(ii)	Vaccines only work against certain strains; Because the antigens they possess are different; Enables company to target strain likely to be prevalent later / most common strain;	2 max	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
6	(a)	(i)	Many people do not go to the doctor;	1	
6	(a)	(ii)	36000;	1	No marks awarded for working here as calculation is very straightforward
6	(b)		Increases uptake of sodium ions/glucose/sugars / salts; By <u>co</u> -transport channels/proteins; Lowers water potential in cells/tissue; Water moves out of intestine/into cells; By osmosis;	3 max	Q Accept any correct alternative for lowering water potential in cells.
6	(c)		Same sugars/antigens on bacteria/nerve cells; Bind with antibody/form antigen-antibody complex; Have complementary shape/fit binding site;	3	Do not accept references to same shape as equivalent to complementary. Reject react Reject active site
6	(d)		Diaphragm will not move down/flatten /contract; Thoracic cavity/lung volume not increased so cannot breathe in;	2	Ignore references to breathing out

Question	Part	Sub Part	Marking Guidance	Mark	Comments
7	(a)		<p>1 Cholera bacterium is prokaryote;</p> <p>2 Does not have a nucleus/nuclear envelope/ has DNA free in cytoplasm/has loop of DNA;</p> <p>3 and 4 Any two from</p> <p>No membrane-bound organelles/no mitochondria / no golgi/ no endoplasmic reticulum/etc;</p> <p>5 Small ribosomes only;</p> <p>6 and 7 Any two from</p> <p>Capsule/flagellum/plasmid / cell wall/etc;</p>	5 max	<p>Maximum of 2 marks for points 3 and 4.</p> <p>Maximum of two marks for points 6 and 7.</p>
7	(b)		<p>Advantages:</p> <p>1 Small objects can be seen;</p> <p>2 TEM has high resolution;</p> <p>3 Wavelength of electrons shorter;</p> <p>Limitations:</p> <p>4 Cannot look at living cells;</p> <p>5 Must be in a vacuum;</p> <p>6 Must cut section / thin specimen;</p> <p>7 Preparation may create artefact</p> <p>8 Does not produce colour image;</p>	5 max	<p>Advantages: allow maximum of 3 marks.</p> <p>Accept better</p> <p>Limitations: allow maximum of 3 marks.</p>