

GCE
AS and A Level

Human Biology

AS exams 2009 onwards
A2 exams 2010 onwards

Unit 1: **Specimen mark scheme**

Version 1.0





General Certificate of Education

Human Biology 2405

HBIO1 The Body and its Diseases

Mark Scheme

Specimen Paper

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Question 1

- (a) suitable reasons;;
e.g. fats, because fats have a very high energy content; 1

e.g. salt, because too much promotes high blood pressure; 1
- (b) Two suitable pieces of information;;
With reasons;;

e.g. the size of the pack;
To know the total content of named ingredient; 2

e.g. Content of any allergens;
If they are allergic to e.g. peanuts; 2
- Total 6**

Question 2

- (a) Unable to pump chloride ions out of cell;
Water potential too high outside cell/lower inside cell;
Water does not move into mucus;
By osmosis; 3 max
- (b) (i) Mucus lines gut/enzymes cannot be released;
Unable to absorb food; 2
- (ii) Mucus blocks respiratory tract;
Obstructs flow of air;
(Chronic) bronchitis; 2
- Total 7**

Question 3

- (a) **A** is the cell wall;
B is the capsule/slime layer; 2
- (b) Protein synthesis/translation; 1
- (c) Distance on diagram 92mm, equal to 92 000 μm
Principle of magnification is 92 000 divided by 2;

46 000 times;; 2
- (d) Suitable suggestion;

e.g. The 'structure' is caused by preparation method/ converse; 1
- Total 6**

Question 4

(a)	(i)	Build up of tissue fluid;	1
	(ii)	Worm blocks/obstructs lymph vessel; Less fluid can drain into lymph system;	2
(b)		Increases tissue fluid formation; More difficult for fluid to be reabsorbed into capillary;	2
(c)		80mg (no mark) Above this no extra benefit; Higher doses may carry side effects;	2
			Total 7

Question 5

(a)		Allows comparison with different numbers in the different groups;	1
(b)		Smokers are more likely to have MI then non-smokers; The more cigarettes smoked, the greater the risk;	2
(c)		Other types of information;; Explanations;; e.g. Genetic factors; Genes/alleles inherited can predispose;	2
		Obesity; More overweight, more likely to have MI;	2
(d)		Suitable suggestion; e.g. Number from questionnaire, was truth told;	1
			Total 8

Question 6

(a)	(i)	More substrate leads to more active sites being used (at a time);	1
	(ii)	All active sites being used/amount of enzyme is the limiting factor;	1
(b)		pH probe gives quantitative read-out; pH paper is more qualitative/depends on judgement of user about colour;	2
(c)		Olestra a different shape (from fat/sugar); Will not fit active site of (digestive) enzymes/lipase;	2
			Total 6

Question 7

- (a) (i) Hydrolysis; 1
- (ii) Amino acids;
Glucose; 2
- (b) (i) Small numbers of patients;
Differences may not be significant;
Especially for drug induced;
For all causes, number of male and female with pancreatitis the same; 4

Total 7**Question 8**

- (a) Damage to lining/endothelium (of artery);
Fatty streaks/ clumps of macrophages and lymphocytes;
Fibrous plaques;
(of) White cells, lipid/cholesterol, connective tissue;
Blocking lumen (of artery); 4 max
- (b) Balloon inflated in;
Coronary artery;
Improves supply of blood to heart muscle;
Oxygen for respiration;
Heart (better) able to meet demands of exercise; 4 max

Total 8**Question 9**

- (a) Antibody is a protein with specific tertiary structure;
Has binding site(s);
That only the CJD protein fits into; 2 max
- (b) Advantages,
Allow government to find out how many cases will develop;
Allow people to know for sure that they don't/do have the condition;
- Disadvantages,
No treatment, so positive test simply causes fear;
Not known if all carriers will get the disease; 3 max

Total 6

Question 10

- (a) (i) Reference to aseptic technique;
Sample of bacteria, e.g. broth culture or lawn of bacteria;
Add sample of milk;
Incubate;
Reduction in turbidity/inhibition zone;
Reference to suitable control, e.g. repeat using sterile water instead of milk; 4 max
- (ii) Bacteria not exposed to this antibiotic before;
So unlikely to have developed/evolved resistance; 2
- (iii) Suitable reasons;;;

e.g. May be toxic to patient;
May not be as effective as current antibiotics/ on resistant species;
May be broken down/digested in body;
May be too expensive; 3 max
- (iv) Membrane selectively permeable/controls entry and exit from cell;
More permeable allows essential substances to leave cell/allows toxic substances in;
May lead to osmotic effects/described; 2 max
- (b) (i) Contains antibodies;
Pass across placenta;
Passive immunity;
Specific to pathogen; 3 max
- (ii) Macrophage engulfs antigen;
Presents antigen to T-cell;
Releases substances that activate B-cell that makes antibody to this antigen;
Antigen binds to antibody on specific B-cell;
B-cell activated;
Produces clone;
Plasma cells;
Release specific antibody;
Memory cells;
Immunological memory of original antigen; 6 max

Total 20