Version 1.0

General Certificate of Education (A-level)
June 2012

Human Biology HBIO1

(Specification 2405)

Unit 1: The Body and its Diseases

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334).
Registered address: AQA, Devas Street, Manchester M15 6EX.

Question	Marking Guidance	Mark	Comments
1 (a)	1. Ribosome; 2. Plasmid; 3. Capsule; 4. Flagellum;	4	
1 (b)	1. Viruses are not cells; 2. Viruses do not have metabolism/named metabolic process; 3. Viruses do not have cell walls; 4. Viruses do not synthesise proteins / have ribosomes; 5. Viruses are inside cells / antibiotics need to enter cells;	2 max	
	Total	**6**	

Question	Marking Guidance	Mark	Comments
2 (a)	1. Does not contain whole virus/antigen is only part of the virus; 2. Other parts/DNA/RNA needed to become ill;	2	
2 (b)	1. Virus mutates; 2. (Different strains of virus have) different antigens; 3. Different strains (circulating each year); 4. To ensure enough memory (B) cells present / previous memory cells not effective/antigen not recognised by memory cells;	2 max	
	Total	**4**	

Question	Marking Guidance	Mark	Comments
3 (a)	1. Reduces constipation/aids digestive transit/avoids diverticulitis; 2. Prevents colon cancer; 3. Slows absorption of glucose; 4. Promotes healthy gut flora;	2 max	
3 (b)	1. Wholemeal bread contains less digestible carbohydrate/starch; 2. So less glucose available to absorb; ***OR*** 3. Fibre in wholemeal bread slows digestion (of starch/ carbohydrate); 4. So glucose absorbed more slowly/less glucose absorbed; ***OR*** 5. GI/GL of wholemeal flour lower than white flour; 6. So blood glucose concentration not raised as much;	4 max	
	Total	**6**	

Question	Marking Guidance	Mark	Comments
4(a)	1. Protein/immunoglobulin; 2. Released by B cells/plasma cells; 3. In response to antigen / binds to a specific antigen;	2 max	
4 (b) (i)	(Time taken for,) 1. Antigen to be recognised by T cells; 2. B cells activation/clone formation; 3. Plasma cells to release antibodies; 4. Protein synthesis;	3 max	1. Allow one mark for antigen presentation 3. Accept plasma cells produce antibodies
4 (b) (ii)	1. More antibodies; 2. Produced faster; 3. Destroys virus before symptoms appear/makes them ill;	2 max	
	Total	**7**	

Question	Marking Guidance	Mark	Comments
5 (a)	1. Reduces enzyme/metabolic activity; 2. That might damage/break down cells; ***OR*** 3. It slows respiration/metabolism; 4. Conserving energy reserves / so cells can live longer;	2 max	
5 (b)	1. Water potential is the same as the cells; 2. So water doesn't enter or leave cells; 3. By osmosis; 4. So cells don't burst / shrink;	2 max	
5 (c)	Isotonic solution: 1. Increases blood volume; 2. So keeps circulation to (vital) organs/tissues; 3. Prevents osmotic damage; Red cells: 4. <u>Red cells</u> carry oxygen; 5. So improve supply for / maintain respiration;	2 max	4. QWC
	Total	**6**	

Question	Marking Guidance	Mark	Comments
6 (a)	1. Thick mucus present; 2. Blocks pancreatic duct / prevents enzymes entering gut; 3. Digests food the person has eaten;	2 max	Ignore references to mucus preventing absorption 2. Allow 'little release of own enzymes'
6 (b)	5.48/5.5(%);; ***OR*** (if wrong answer) 2.1/38.3 x 100;	2	Correct answer scores 2 marks Award 1 mark for incorrect numerator
6 (c)	1. Less fat in faeces; 2. Therefore more fats/lipids digested/absorbed; 3. Patients gain mass; 4. (Because more lipids/fats digested or absorbed) more energy/materials for growth;	4	Accept correct answers based on other digestive enzymes
	Total	**8**	

Question	Marking Guidance	Mark	Comments
7 (a) (i)	Mycobacterium;	1	
7 (a) (ii)	1. Mucus blocks airways; 2. Forms scars/tubercles; 3. Breaks down tissues/alveoli; 4. White blood cells cause damage;	2 max	
7 (b) (i)	1. Investigation is looking for most effective antibiotic; 2. So effects are compared with each other; ***OR*** 3. Control would be no antibiotic / it's not ethical; 4. TB is a potentially fatal disease/ can be spread to other people; 5. Would be unethical/wrong not to give treatment;	2 max	
7 (b) (ii)	1. Isoniazid; 2. Lowest time to decrease bacteria (in saliva by 50%);	2	
	Total	**7**	

Question	Marking Guidance	Mark	Comments
8 (a)	1. (Blood pressure) falls (rapidly) at first then levels out; 2. Levels out at a value of 17-17.5 kPa / after 8 weeks;	2	QWC
8 (b)	1. Smoking/CHD also affects blood pressure; 2. So only one variable; 3. Orlistat may interfere with medication they are taking / medication for CHD may affect blood pressure; 4. May interact with chemicals in cigarette smoke; 5. May make CHD worse;	2 max	
8 (c)	1. Less fat absorbed / lower energy intake; 2. Reduces body mass; 3. Lowers blood pressure; 4. High body mass/ hypertension/lipids in blood encourage atheroma formation; 5. Atheroma leads to CHD/named type of CHD;	4 max	
	Total	**8**	

Question	Marking Guidance	Mark	Comments
9 (a)	1. No impulse (from nervous system) required / beats on its own; 2. Reference to SAN; 3. Generates its own impulses;	2 max	
9 (b)	(A) C E B D;	1	
9 (c)	1. Allows left ventricle to pump (oxygenated) blood (from placenta) round body; 2. Lungs not carrying out gas exchange; 3. Improves efficiency of oxygen supply to body (except lungs) / support respiration;	2 max	Accept: Reduces blood flow to underdeveloped lungs; Accept: High blood pressure might damage lungs;
9 (d)	1. Left ventricle too small to pump enough blood round body; 2. Aorta too narrow to allow enough blood round body; 3. (Widening narrow artery) increases blood flow to aorta; 4. (Increasing the hole) enables blood from left atrium to be pumped by right side of heart; 5. More oxygenated blood round body; 6. Maintains respiration for energy / growth;	3 max	
	Total	**8**	

Question	Marking Guidance	Mark	Comments
10 (a)	Production of vitamin K / digestion of fibre/cellulose / compete with pathogens/bind mutagens;	1	
10 (b)	1. Increased atheroma formation; 2. Damage to endothelium/lining; 3. Of coronary artery; 4. Fatty deposits <u>in</u> wall (of artery); 5. Leads to thrombosis/blood clot; 6. Can cause MI/blockage of coronary artery; 7. Reduces blood flow/oxygen/ glucose to heart muscle; 8. Can lead to angina;	6 max	Accept correct references to LDLs/HDLs for first marking point Accept blood clot formation /embolus for thrombosis
10 (c)	1. Lowers water potential; 2. Of plasma / (at venule end) in capillary; 3. Aids/increases tissue fluid reabsorption; 4. <u>Water</u> from tissue fluid; 5. (Enters capillary) by osmosis;	3 max	
10 (d)	1. So there was only one variable; 2. Any change in blood/bacteria present is due to chocolate; 3. So results can be compared;	2	1. Accept factor for variable
10 (e)	Suitable suggestion with explanation;; 1. Bacteria present in food; 2. Different foods contain different bacteria; 3. Taken antibiotics; 4. Which effects which bacteria remain;	2 max	

Question	Marking Guidance	Mark	Comments
10 (f)	(Yes) 1. Chocolate eaters have lower cholesterol; 2. Chocolate lovers have higher protein/lower risk of oedema; (No) 3. Only 22 people in study; 4. Not tested on women/only tested on men; 5. Only carried out for 5 days; 6. Could be result of diet eaten, since they all ate the same diet (idea that the 'common' diet might not be the usual diet); 7. Bacteria different in chocolate-eating group but we don't know that this difference is significant/beneficial; 8. No suggestion about how much/what sort of chocolate is good for health;	6 max	Max 5 if only one side of the argument addressed
	Total	**20**	