Version 2

General Certificate of Education (A-level)
January 2012

Biology BIOL1

(Specification 2410)

Unit 1: Biology and Disease

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 candidates' 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 candidates' 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 candidates' 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.

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Although specific marks are not awarded, marks will take in to account the quality of written communication. Credit will only be awarded where candidates have presented information clearly and coherently and have used the specialist vocabulary indicated in the mark scheme for this unit. Specific references to quality of written communication appear in the comments column of this mark scheme.

Question	Marking Guidelines	Mark	Comments
1(a)	1. Crush/grind; 2. With ethanol/ alcohol; 3. Then add water/then add to water; 4. Forms emulsion / goes white/cloudy;	3	2 Water must be added <u>after</u> ethanol for third mark. 4 Do not accept carry out emulsion test.
1(b)(i)	4/four;	1	
1(b)(ii)	1. Phosphate/ PO_4; 2. Instead of one of the fatty acids / and two fatty acids;	2	"It" refers to phospholipid. 1 Accept minor errors in formula. Do not accept phosphorus/phosphorus group.
1(b)(iii)	1. Double bonds (present); 2. Some/two carbons with only one hydrogen / (double bonds) between carbon atoms / not saturated with hydrogen; 3. In (fatty acid) **C**/3;	2 max	Answer refers to unsaturated unless otherwise clearly indicated. 1 and 2. May be shown in appropriate diagram.

Question	Marking Guidelines	Mark	Comments
2(a)	1. (Diaphragm/diaphragm muscle) relaxes/relaxed; 2. Domed shape / (diaphragm) moves up; 3. Increases pressure; 4. Decreases volume;	3 max	Ignore references to inhalation, intercostal muscles or ribs if given as additional information.
2(b)	1. Extend/extrapolate curve/graph; 2. (Read off where) it flattens/ reaches maximum / peaks;	2	
2(c)	1. (Without inhaler) narrower bronchioles / bronchioles not dilated; 2. Muscle (surrounding bronchioles) contracted; 3. Less air able to pass through / more difficult for air to pass through;	2 max	Assume answer relates to Curve **A**, unless otherwise stated. Accept converse for **B.** 1 Do not allow contracted in this conext.

Question	Marking Guidelines	Mark	Comments
3(a)	✓ ✓ ✓ ✓ ✓ ✓	3	Mark across, one mark for each correct row. If crosses are used and no ticks, accept cross as equivalent to tick. If crosses are used as well as ticks, mark tick only.
3(b)(i)	1. Mitochondria respire; 2. Release energy/ produce ATP; 3. Transport against gradient; ***OR*** 4. Infolding of membrane; 5. Increases area; 6. More proteins for active transport;	2 max	2. Do not credit make energy 3. Do not credit active transport as this is given in question. 3. Do not accept diffusion against. 4. Reject microvilli but if mentioned can still accept points 5 and 6.
3(b)(ii)	1. Ribosomes make proteins/ enzymes; 2. Enzymes are proteins; ***OR*** 3. Mitochrondria respire; 4. Release energy/produce ATP; 5. (Energy/ATP) for protein / enzyme synthesis;	2	Ignore references to Golgi or rough ER.
3(b)(iii)	Microvilli increase area / have large area;	1	Ignore references to other properties of microvilli.

Question	Marking Guidelines	Mark	Comments
4(a)	Something that increases chance / increases probability / makes it more likely;	1	
4(b)(i)	1976 –/to/and 1980;	1	
4(b)(ii)	1980 –/to/and 1996;	1	
4(c)	1. Correlation does not mean that there is a causal relationship; 2. May be some other factor/named factor; 3. Associated with vehicles and asthma / producing rise in both; 4. (After 1980) asthma continues to rise but exhaust concentration falls / negative correlation (after 1980);	3 max	1. Do not accept casual

Question	Marking Guidelines	Mark	Comments
5(a)(i)	Left ventricle;	1	
5(a)(ii)	Thick muscle/thick walls;	1	Accept more muscle/more muscular. Ignore stronger muscle.
5(b)(i)	85.7/86;	1	Accept 85 Ignore additional decimal places.
5(b)(ii)	Two marks for correct answer of 7905 – 7998;; One mark for incorrect answer in which candidate provides evidence of multiplying heart rate by stroke volume;	2	Accept either formula or illustration with figures from table.
5(c)	1. Closed open; 2. Open closed;	2	

Question	Marking Guidelines	Mark	Comments
6(a)	Has more than one/four polypeptide chains / made up of polypeptide chains;	1	
6(b)	1. Antibody/variable region has specific amino acid sequence/primary structure; 2. The shape/tertiary structure of the binding site; 3. Complementary to/fits/binds with these antigens; 4. Forms complex between antigen and antibody;	3 max	2 Do not accept active site for this point. 3 Accept active site for this point.

Question	Marking Guidelines	Mark	Comments
7(a)	Amino acid / amino acids ;	1	If anything else is given as well do not award mark.
7(b)(i)	1. Affects one monomer/amino acid; 2. Not found in all <u>active</u> <u>sites</u>;	2	i.e. What is affected i.e. Where it is found. 2. Must relate to active site. Enzyme is insufficient.
7(b)(ii)	1. **X**; 2. Enzyme in both pathways;	2	2 Award independently
7(c)	1. Occupies/blocks/binds to active site; 2. Substrate will not fit / does not bind / no longer complementary to / enzyme-substrate complex not formed;	2	i.e. What it does in terms of the active site. 1. Ignore references to change in shape and shape of aspirin molecule. Ignore reference to competitive inhibitor i.e. Consequence required
7(d)	1. Prevents/reduces formation of thromboxane; 2. Blood clots do not form / less likely to form; 3. (Do not block) <u>coronary</u> arteries / vessels; 4. Heart muscle/wall gets oxygen;	3 max	1. Must prevent/reduce production. 2. Accept converse from this point onwards 4. Reference to heart must be qualified.

Question	Marking Guidelines	Mark	Comments
8(a)	1. Vaccines contain antigens / antigens are injected; 2. Dead pathogens / weakened pathogens; 3. Memory cells made; 4. On second exposure memory cells produce antibodies / become active / recognise pathogens; 5. Rapidly produce antibodies / produces more antibodies; 6. Antibodies destroy pathogens; 7. Herd effect / fewer people to pass on disease;	5 max	Ignore references to T or B cells. 2. Accept bacteria/viruses etc but not disease 4. Idea of memory cells responding. 5. Production of antibodies must be qualified for mark. Underlined ideas essential. 6. Accept bacteria/viruses etc but not disease
8(b)	1. Contains glucose/starch/ carbohydrate / sugar; 2. Sodium/salt; 3. Co-transport / symport; 4. Sodium and glucose taken up (from lumen); 5. Lowers water potential in cells/ increases water potential gradient; 6. Water taken up by osmosis;	5 max	1. Candidates may be aware of food based ORS. Accept appropriate carbohydrate sources such as rice/maize flour. 5. Accept Ψ 5 Do not accept converse argument. Water + correct direction + osmosis essential for this mark point.