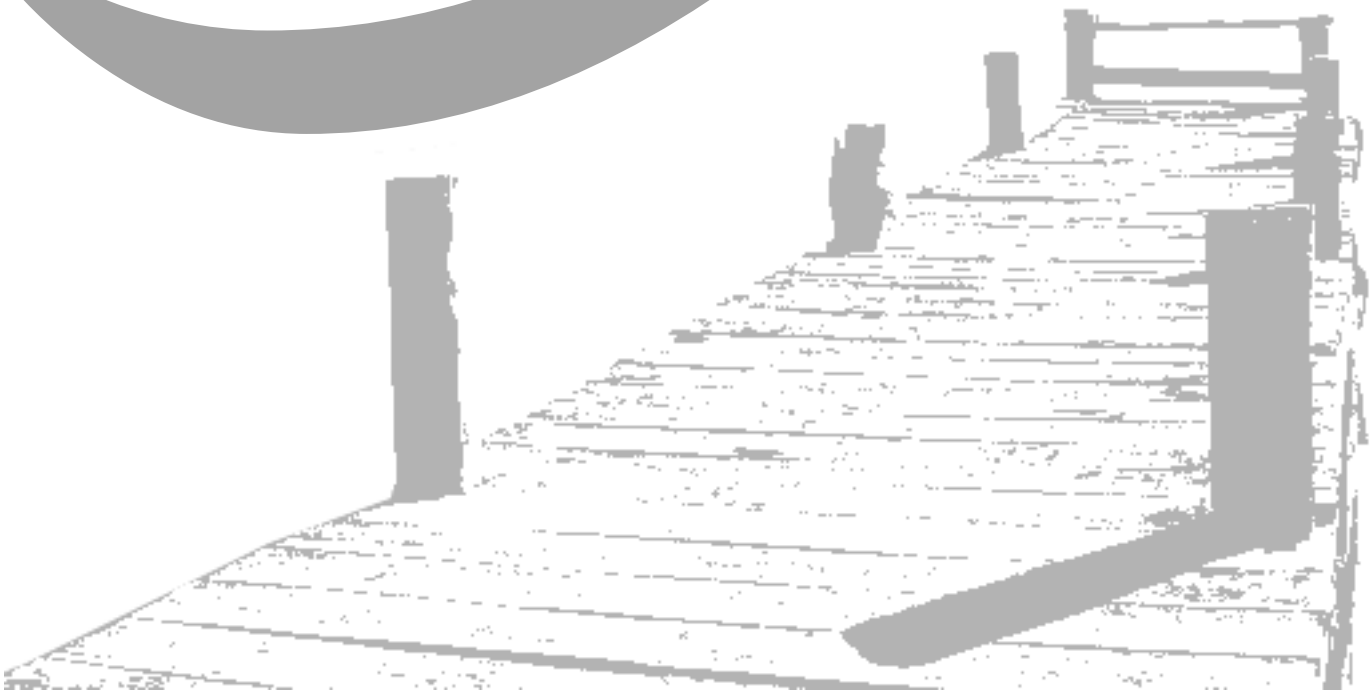
GCE
AS and A Level

Biology

AS exams 2009 onwards
A2 exams 2010 onwards

Unit 1:
Specimen mark scheme

Version 2.0



ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Biology

BIOL1 Biology and disease

Mark Scheme

Specimen paper

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 meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting 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 the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

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

Question 1

(a) Hydrolysis; 1

(b) C_{12};
$H_{22}O_{11}$; 2

(c) (i) One mark for answer that simply refers to increase and subsequent decrease
Two marks for answer that refers to reaching a peak at approximately 6.6 mol dm-3/45 minutes. 2
*(**Q** Descriptions must refer to concentration of glucose and time to gain credit. Do not accept vague references to "It . . . ")*

(ii) No lactase;
Therefore lactose not digested/glucose not produced;
No glucose absorbed therefore concentration in blood stays the same/ does not rise; 3

Total 8

Question 2

(a) (i) Amino acids; 1

(ii) Peptide; 1

(b) Contains specific sequence of amino acids;
Complimentary shape enables attachment to antigen; 2

(c) (Maternal antibodies) are antigens;
Destroyed by (fetal) antibodies / lymphocytes; 2
(**Q** *Do not credit marks where source of antigens or antibodies/ lymphocytes is ambiguous.)*

Total 6

Question 3

(a) Smaller number of alveoli;
Larger air space per alveolus;
Thicker walls; 2 max
*(**Q** Accept converse for normal cells)*

(b) Less surface area of alveoli;
Diffusion of gases / gas exchange reduced / less oxygen enters blood;
Narrower bronchioles reduce gas flow;
Loss of elasticity reduces gas flow / unable to ventilate efficiently;
Lungs permanently inflated;
Less energy available / less respiration possible for muscles; 3 max
*(**Q** Award maximum of two marks if candidate suggests energy is 'used' in respiration.)*

Total 5

Question 4

(a) Measure diameter / radius / area of clear zone;
Detail of method e.g. determine mean diameter of each clear zone / use of graph paper to determine area; 2

(b) No measurements at intermediate pH values i.e. 5-7 / 7-9; 1

(c) Enzyme denatured / tertiary structure altered;
Ionic / hydrogen bonds broken;
Substrate cannot bind to active site; 2 max
*(**Q** To gain first marking point, answer should use terminology specified in scheme)*

(d) Use of denatured / boiled enzyme;
At all pH values; 2

Total 7

Question 5

(a) (i) **C** and **D**; 1

(ii) Left ventricle with thicker wall / more muscle / (muscle in) left ventricle contracts more forcefully; 1

(b) Higher in atria / lower in ventricles;
Atrioventricular valves / valves between atria and ventricles open; 2
(***Q*** *Credit second mark only if valves are named or correctly located.)*

(c) (i) Allows blood to pass into ventricles / from atria / so that atria can empty;
Before ventricles contract; 2

(ii) Ventricle contracts from base / upwards;
Blood pushed through B and C / arteries / all blood rejected; 2

Total 8

Question 6

(a) Bacteria attached to/carried by;
Droplets of mucus/water; 2

(b) Vaccination rates;
Immigration;
Different strains of TB;
Living conditions related to transmission / diet; 2 max

(c) $\frac{0.7}{4.6 \times 100}$;

15.2; 2
(Correct answer = 2 marks)

Total 6

Question 7

(a) Receptor;
Reference to tertiary structure of protein;
Complementary shape; 3
*(**Q** Do not credit 'same shape' but allow suitable description of complimentary shape.)*

(b) (i) Active transport;
Using ATP;
Carrier proteins; 3

(ii) Water potential lowered in small intestine;
Osmotic loss of water; 2
(QWC First mark only credited if water potential is clearly linked to intestine or blood)

(c) Broken down by enzymes / not absorbed as molecules are too large; 1

(d) Ensures memory cells produced; 1

Total 10

Question 8

(a) Fatty material within walls of arteries;
Vessels narrow;
Blood pressure rises;
Weakened blood vessels may burst; 4

(b) Carbon monoxide combines with haemoglobin/causes less oxygen to be transported;
Decreases concentration of antioxidants in blood;
Increases the damage done to artery walls;
Blood clot may occur;*
Blood pressure increased*
Blocks flow of blood to heart/in carotid arteries;* (4 max)

Saturated fat associated with cholesterol;
Cholesterol deposited in arteries;
Atheroma formation;
Blood clot may occur*;
Blood pressure increased*
Blocks flow of blood to heart/in carotid arteries*; (4 max)

**Allow reference to these points only once.*

Cholesterol / blood clot causes constriction of coronary arteries;
Less oxygen transported to heart muscle tissue; 6 max
*(**Q** Do not allow credit for such expressions as "furring up arteries", "putting strain on the heart" and "bad cholesterol")*

Total 10