



## **General Certificate of Education**

# **Applied Science**

## **8771/8773/8776/8779**

**SC14      The Healthy Body**

# **Mark Scheme**

*2008 examination – January series*

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.

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.

Further copies of this Mark Scheme are available to download from the AQA Website: [www.aqa.org.uk](http://www.aqa.org.uk)

Copyright © 2008 AQA and its licensors. All rights reserved.

#### COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

**Question 1**

(a)(i)	Thyroid	(1) (AO1)	<b>1</b>
(ii)	Control of metabolic rate; Development of nervous system/brain; Body growth; Increase number of adrenaline receptors in body; Increase metabolism of fats; Increase blood glucose; <i>Any 2 for 1 mark each</i>	(1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1)	<b>2</b>
(b)(i)	Iodine needed to make thyroxine	(1) (AO1)	<b>1</b>
(ii)	Maintenance of blood volume; Nerve conduction;	(1) (AO1) (1) (AO1)	<b>2</b>
(iii)	Muscle cramps; Loss of appetite	(1) (AO1) (1) (AO1)	<b>1</b>
(iv)	Aldosterone; a mineralocorticoid; Released from adrenal glands/adrenal cortex; Stimulates distal convoluted <u>tubules/kidney tubules</u> ; to reabsorb Na <sup>+</sup> ions; from filtrate; Also stimulates Na <sup>+</sup> ions resorption from saliva; perspiration/sweat glands; gastric juices	(1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1)	<b>4</b>

**Total Mark: 11****Question 2**

(a)	1 mark for identifying mitochondria	(1) (AO2)	<b>1</b>
(b)	<b><i>Question is incorrect, please see Examiner Report. This mark has not been included in the final total of the paper.</i></b>		
(c)	$(10 \times 3 \text{ ATP}) + (2 \times 2 \text{ ATP}) = 34 \text{ ATP}$	(1) (AO2) (1) (AO2)	<b>2</b>
(d)	Broken down to glycerol; and fatty acids glycerol is used to generate pyruvate; fatty acids used to generate NADH/FADH <sub>2</sub> ; and pyruvate	(1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2)	<b>4</b>

**Total Mark: 7**

**Question 3**

(a)	1 mark for correct identification of a coronary artery	(1) (AO2)	<b>1</b>
(b)	Heart tissue may die; any sensible suggestion	(1) (AO1)	<b>1</b>
(c)(i)	Pulse oximeter	(1) (AO1)	<b>1</b>
(ii)	Non invasive	(1) (AO1)	<b>1</b>
(iii)	98%	(1) (AO2)	<b>1</b>
(iv)	Sigmoid curve; To right of existing curve	(1) (AO2) (1) (AO2)	<b>2</b>
(d)	Combines with water; In red blood cells; By action of enzyme carbonic anhydrase; To form carbonic acid; Carbonic acid dissociates; Into bicarbonate ions; and hydrogen ions; excess hydrogen ions reduce blood pH/increase acidity	(1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1)	<b>5</b>

**Total Mark: 12****Question 4**

(a)	Kill harmful bacteria	(1) (AO2)	<b>1</b>
(b)(i)	$289 \times 800 = 2312 \text{ kJ}$ for 1 mark $2.31 \text{ MJ}$ for 1 mark	(1) (AO2) (1) (AO2)	<b>2</b>
(ii)	$90/34 = 2.65$ times	(1) (AO2)	<b>1</b>
(iii)	9 – 11 mg / 100ml blood	(1) (AO1)	<b>1</b>
(iv)	$17 \times 7.2 = 122.4$ for 1 mark $(122.4/289) \times 100 = 42.35\%$ for 1 mark	(1) (AO2) (1) (AO2)	<b>2</b>
(v)	Lower; allow ecf	(1) (AO2)	<b>1</b>
(c)(i)	Mother's milk does not supply enough nutrients for the baby at around 6 months	(1) (AO2)	<b>1</b>
(ii)	Iron ; any sensible suggestion Vitamin C ; any sensible suggestion	(1) (AO2) (1) (AO2)	<b>2</b>
(iii)	Vitamin C helps with iron absorption; Low vitamin C diet will mean reduced ability to absorb iron; If alternative answers given in (ii) so give credit that need one for uptake/function of other; need to identify which is the helper/facilitator	(1) (AO2) (1) (AO2)	<b>2</b>

**Total Mark: 13**

**Question 5**

(a)(i)	Chemical digestion; Digest large molecules into small molecules; for absorption mechanical digestion; crushing; grinding; tearing; increasing surface area for digestion	(1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1)	<b>5</b>
(ii)	Reduces plaque build up Reduces acid attack of enamel; Reduces tooth decay Lysozyme; kills bacteria IgA antibodies attach to bacteria; Contains defensins; that attract phagocytes	(1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2)	<b>4</b>
(b)	Give person disclosing tablets; Chew tablets for given amount of time; Observe the degree of staining on the teeth; No stain = clean teeth After brushing teeth, observe degree of staining; If still stained, need to keep brushing till stain is removed	(1) (AO3) (1) (AO3) (1) (AO3) (1) (AO3) (1) (AO3) (1) (AO3)	<b>5</b>

**Total Mark: 14****Question 6**

(a)	Male values higher than females in general (accept converse); Male has highest value; Female has lowest value Male values spread across the range for Hct; Female values at the lower end of the Hct; Any sensible suggestions	(1) (AO3) (1) (AO3) (1) (AO3) (1) (AO3) (1) (AO3)	<b>3</b>
(b)(i)	J	(1) (AO3)	<b>1</b>
(ii)	D Low haematocrit; and haemoglobin; Indicative of low iron/anaemia; Low oxygen carrying capacity; Accept explanation for athlete J for 3 marks	(1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2)	<b>4</b>
(c)(i)	Rice, noodles, pasta contain complex carbohydrate/starch; This is broken down to glucose; And converted to glycogen; in muscle/liver stores;	(1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2)	<b>4</b>
(ii)	Glycogen can be converted back to glucose when exercising; Glucose gels/cereal bars provide 'instant' energy for the athletes; glucose not needed to be broken down for respiration; when glycogen stores are depleted; are easier to eat when exercising Max 3	(1) (AO2)  (1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2)	<b>3</b>

**Total Mark: 15**

**Question 7**

(a)	Reabsorbtion of water; Reabsorbtion of sodium ions; Reabsorbtion of potassium ions; Propulsion of faeces towards rectum	(1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1)	<b>2</b>
(b)	<u>Alternate</u> contraction; Of longitudinal and circular; <u>smooth</u> muscle; layers;	(1) (AO1) (1) (AO1)	<b>3</b>
(c)(i)	Needed for NAD <sup>+</sup> synthesis ; dilates peripheral blood vessels	(1) (AO1) (1) (AO1)	<b>1</b>
(ii)	Pellagra; loss of weight; photosensitivity; skin ulcers;	(1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1)	<b>1</b>

**Total Mark: 7**