



**General Certificate of Education (A-level) Applied
June 2013**

Applied Science

SC14

**(Specification
8771/8773/8776/8777/8779)**

Unit 14: The Healthy Body

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.

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Question	Part	Sub part	Marking guidance		Mark	Comment
1	a		<u>Glucose</u> (from meal) <u>absorbed</u> / <u>enters</u> blood stream	AO2	1	Allow 'diffused' for 'entered'
1	b		(Glucose) taken up by <u>cells</u> /used by <u>cells</u> Used in <u>respiration</u> /converted to <u>glycogen</u>	AO2 AO2	2	
1	c		(08.00-10.00) glucagon secreted/released Glycogen converted to glucose (by glucagon)/glycogenolysis (10.00-11.00) insulin released (Insulin stimulates) glucose to glycogen/glucose uptake/glycogenesis	AO2 AO2 AO2 AO2	4	Max 3 if sequence incorrect Ignore any reference to site of glucagon / insulin production

Total: 7 Marks

2	a		Smoking increases risk of a heart attack Effect (due to smoking) increases as blood cholesterol increases (accept only once) High blood pressure increases chance of heart attack Smoking and high blood pressure increase the risk <u>further</u> OWTTE	AO2 AO2 AO2 AO2 Max2	2	Mk pt 1: 'Risk of having a heart attack is high' ≠ 'increased' Mk pt 2: 'High cholesterol' ≠ 'cholesterol increases' Allow 'heart attack' ≡ 'heart failure' N.B. 'smoking causes an increase in blood pressure...increases the risk of heart attack' = 2
2	b	i	Smoker: 17% increases to 23%= 6% Allow 5-7% increase / 35-40% increase Non-smoker: 7% increases to 15%= 8% Allow 6-8% increase /114% Allow 100 – 135% increase Final justified decision related to who has increased their risk more	AO2 AO2 AO2	3	N.B. candidates could compare in different terms i.e. non-smoker has more than doubled their risk but smoker has increased their risk by about a third

2	b	ii	Cholesterol builds up in the <u>arteries</u> Causing plaques / blockages / narrowing / restricting blood flow Blood pressure increases Reduced oxygen to heart muscle Heart muscle cannot respire Heart muscle cannot contract	AO1 AO1 AO1 AO1 AO1 Max4	4	'Fat' ≠ 'cholesterol' Mk pt 2: 'reduces' is not same as 'restricts'
2	c		Platelets stick together to form a clot Which narrows / blocks the artery / restricts blood flow Could cause angina / heart attack / stroke in the brain	AO2 AO2 AO2 Max2	2	Mk pt 1: Ignore 'sticky' platelets – insufficient Mk pt 2: 'reduces' is not same as 'restricts'

Total: 11 Marks

3	a	i	Chemical (digestion) Digests large molecules into small ones Mechanical (digestion) Crushing / grinding / tearing Increased surface area (for digestion)	AO1 AO1 AO1 AO1 Max4	4	Mk pt 2 Ignore 'smaller/large particles'
3	a	ii	(Salivary) amylase Allow ptyalin	AO1	1	
3	a	iii	Starch No e.c.f. Correct answer only	AO1	1	
3	a	iv	Maltose / dextrans	AO1	1	

3	b		<p>The marking scheme for this part of the question includes an assessment for the Quality of Written Communication (QWC) .There are no discrete marks for the assessment of quality of written communication but QWC will be one of the criteria used to assign the answer to an appropriate level below:</p> <table border="1"> <thead> <tr> <th>Level</th> <th>Marks</th> <th>Descriptor</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>4-5</td> <td> Answer is full and detailed and is supported by an appropriate range of relevant points such as those given below: - argument is well structured with minimum repetition or irrelevant points - accurate and clear expression of ideas with only minor errors in the use of technical terms, spelling and punctuation and grammar </td> </tr> <tr> <td>2</td> <td>2-3</td> <td> Answer has some omissions but is generally supported by some of the relevant points below: - the argument shows some attempt at structure - the ideas are expressed with reasonable clarity but with a few errors in the use of technical terms, spelling, punctuation and grammar </td> </tr> </tbody> </table>	Level	Marks	Descriptor	3	4-5	Answer is full and detailed and is supported by an appropriate range of relevant points such as those given below: - argument is well structured with minimum repetition or irrelevant points - accurate and clear expression of ideas with only minor errors in the use of technical terms, spelling and punctuation and grammar	2	2-3	Answer has some omissions but is generally supported by some of the relevant points below: - the argument shows some attempt at structure - the ideas are expressed with reasonable clarity but with a few errors in the use of technical terms, spelling, punctuation and grammar	AO3	5	Max 3 if not mentioned anything about using disclosing tablets
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Total: 12 Marks

4	a	i	95-99(%) Allow 95 - any figure between 99 and 100 inclusive.	AO1	1	Must be a range.
4	a	ii	Non-invasive / less invasive	AO1	1	Allow 'no need to take blood'
4	b	i	Suitable, even scale X axis mmHg Correct plotting for sufferer and non-sufferer	AO2 AO2 AO2	3	

4	b	ii	38 (allow 36-42) or as read from correct graph Allow ecf from part (b) (i) as long as scales are even and appropriate line of best fit	AO2	1	
4	b	iii	O ₂ <u>saturation</u> lower in sufferer (Allow converse) (As) longer/increased diffusion pathway <u>Mucus</u> acts as a barrier to diffusion / makes absorption more difficult	AO2 AO2 AO2 Max2	2	
4	b	iv	0.65 x 20 =13 Full marks for correct answer 1 compensation mark for identification of 65% saturation as part of calculation	AO2 AO2	2	
4	c		Mucus blocks enzyme secretions Large molecules not broken down into smaller ones Large molecules (or molecules not broken down) cannot be absorbed	AO2 AO2 AO2 Max2	2	
Total: 12 Marks						
5	a	i	Has to beat faster / (heart <u>rate</u>) increased To pump <u>more</u> oxygenated blood/oxygen (around the body) / <u>more</u> oxygenated blood/oxygen needed (by the body)	AO2 AO2	2	Ignore 'heart beat increases'
5	a	ii	Increased (heart) <u>muscle</u> <u>More</u> blood pumped out per beat / increased stroke volume	AO2 AO2	2	Mk pt 1: Allow '(heart) muscle becomes stronger'

5	b		The minimum (at rest) amount of energy needed (per unit time) to maintain essential body processes OWTTE	AO1	1	Ignore any reference to surface area / volume
5	c	i	Subject fasts for 12 hours Subject sits at rest Wears respirometer Total O ₂ consumed is measured O ₂ consumed is used to measure BMR	AO1 AO1 AO1 AO1 Max4	4	1 for first mark point and 3 from the remaining 4
5	c	ii	Not confined to 1 room Carried out at home / no need to attend hospital	AO2	1	
5	d		Bread/ pasta/ rice/ potatoes	AO1	1	Accept any reasonable alternatives
Total: 11 Marks						
6	a	i	As a comparison To check it is the variable/diet/milk that is having the effect / to see the effect of the variable/diet/milk	AO3 AO3	2	
6	a	ii	A: (mean) <u>mass</u> increases, (levels off), then decreases at <u>36 days</u> (accept any figure between 33 and 36) B: (mean) <u>mass</u> decreases for <u>3 days</u> then (after 21 days) increases	AO2 AO2	2	Allow 1 compensation mark if the patterns for both are described correctly (but no mention of mass and/or specific times)
6	b		Informed consent Risks involved Whether against religious beliefs / ethical beliefs	AO2 AO2 AO2 Max1	1	Mk pt 3 Allow 'vegans won't drink milk'. Reject 'religion' on its own – must be qualified

6	c	i	More energy/carbs/fats required More iron needed in the diet	AO2 AO2	2	Mk pt 1 Ignore reference to food groups Ignore reference to Vitamin C
6	c	ii	Calcium high but energy low (hence low fat) Vitamin C high (oranges)	AO2 AO2	2	
6	d	i	Take sample of blood Haemoglobin measured Packed cell volume measured	AO1 AO1 AO1	3	
6	d	ii	Anaemia (1 mark) (Extra) iron (tablet/supplement/in diet) (1 mark)	AO1 AO1	2	

Total: 14 Marks

7	a	i	Alveolar number fewer Size of alveoli larger	AO2 AO2	2	
7	a	ii	Reduced surface area (for gaseous exchange) Less diffusion takes place Less oxygen absorbed (by the alveoli)	AO2 AO2 AO2 Max2	2	N.B. 'less oxygen diffused (into blood)' = 2 Allow 'capillaries' ≡ 'blood'
7	b	i	<u>Maximum</u> volume expired in one breath Allow <u>maximum</u> speed of expiration	AO1	1	
7	b	ii	Depends on/measures airflow through bronchi/airways (reduced) Depends on/measures degree of obstruction in the bronchi/airways (increased) Compare his results with normal value / normal value is 400 – 600 (dm ³ min ⁻¹) / less than 400	AO2 AO2 AO2	3	Mk pt 3: Reject 'average' for 'normal'

7	c		<p>The marking scheme for this part of the question includes an assessment for the Quality of Written Communication (QWC) .There are no discrete marks for the assessment of quality of written communication but QWC will be one of the criteria used to assign the answer to an appropriate level below:</p> <table border="1"> <thead> <tr> <th>Level</th> <th>Marks</th> <th>Descriptor</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>4-5</td> <td> Answer is full and detailed and is supported by an appropriate range of relevant points such as those given below: - argument is well structured with minimum repetition or irrelevant points - accurate and clear expression of ideas with only minor errors in the use of technical terms, spelling and punctuation and grammar </td> </tr> <tr> <td>2</td> <td>2-3</td> <td> Answer has some omissions but is generally supported by some of the relevant points below: - the argument shows some attempt at structure - the ideas are expressed with reasonable clarity but with a few errors in the use of technical terms, spelling, punctuation and grammar </td> </tr> </tbody> </table>	Level	Marks	Descriptor	3	4-5	Answer is full and detailed and is supported by an appropriate range of relevant points such as those given below: - argument is well structured with minimum repetition or irrelevant points - accurate and clear expression of ideas with only minor errors in the use of technical terms, spelling and punctuation and grammar	2	2-3	Answer has some omissions but is generally supported by some of the relevant points below: - the argument shows some attempt at structure - the ideas are expressed with reasonable clarity but with a few errors in the use of technical terms, spelling, punctuation and grammar	AO2	5	
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Total: 13 Marks