



General Certificate of Education

Applied Science

8771/8773/8776/8779

SC14 The Healthy Body

Mark Scheme

2007 examination – June series

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Question 1

(a)(i)	3.5 – 7.5 mmol l ⁻¹	(1) (AO1)	1
(ii)	Use dipstick/uristix/clinistix	(1) (AO1)	3
	Dip into the urine sample	(1) (AO1)	
	Check colour change on stick against reference chart	(1) (AO1)	
(b)	Glucagon: releases glucose from glycogen muscle/liver stores	(1) (AO1)	2
	Insulin: makes cells take up glucose	(1) (AO1)	

Total Mark: 6**Question 2**

(a)(i)	(Pulse) oximeter	(1) (AO1)	1
(ii)	She is carrying oxygen normally	(1) (AO2)	1
(b)(i)	Becoming acidic/acidotic. <i>Reject 'has fallen' owtte</i>	(1) (AO2)	1
(ii)	Acts as a buffer;	(1) (AO1)	2
	To mop up excess H ⁺ ions;	(1) (AO1)	
(iii)	Haemoglobin gives up oxygen to the tissues at higher concentrations of oxygen than it normally would; the affinity for oxygen is reduced in the presence of carbon dioxide		2
	<i>any 2 for 1 mark each</i>	(2) (AO1)	
(iv)	Chemoreceptors;		3
	In the medulla/brain stem; Detect pH fall/CO ₂ increase; Increase the rate of breathing; Increasing rate of contraction of intercostal muscles; Increasing rate of contraction of diaphragm		
	<i>Any 3 for 1 mark each</i>	(3) (AO1)	
(c)	More CO ₂ ;	(1) (AO1)	2
	From tissue respiration;	(1) (AO1)	

Total Mark: 12

Question 3

(a)(i)	$3.5 \text{ million} \times 5 = 17.5 \text{ million}$	(1) (AO2)	1
(ii)	$(100 \times 3.5)/45 = 7.78 \text{ million meals}$	(1) (AO2)	1
(b)	<p><i>Lack of iron</i> Anaemia; reduced red blood cell count; reduced oxygen carrying capacity; increased risk of infection; general developmental delay; tired/fatigue</p> <p style="text-align: right;"><i>Any 2 points for each, 1 mark each</i></p>	(2) (AO1)	4
	<p><i>Lack of calcium</i> Inadequate skeletal/bone development; inadequate tooth development; problems with blood clotting; problems with muscle activity; problems with nerve activity</p> <p style="text-align: right;"><i>Any 2 points for each, 1 mark each</i></p>	(2) (AO1)	
(c)(i)	<p>Increases risk of cardiovascular disease ; Increases risk of atherosclerosis/arteriosclerosis/atheroma; development of narrowed arteries (owtte) Increases risk of stroke; Increases risk of type 2 diabetes ; Increase risk of hypertension ; Increased risk of osteoarthritis/bones and joints wearing out/ painful joints Reduced life expectancy</p> <p style="text-align: right;"><i>Any 4 for 1 mark each</i></p>	(4) (AO2)	4
(ii)	<p>Not doing enough daily physical activity; Not eating fruit and vegetables; which can help to fill you up</p>	(1) (AO2) (1) (AO2)	2
(d)	<p>normal diet contains all the salt we need; there is no need to supplement with salt, increased salt [and sodium] linked with hypertension; can lead to a heart attack</p> <p style="text-align: right;"><i>Any 2 for 1 mark each</i></p>	(2) (AO2)	2
(e)(i)	<p>Kidneys have conserved water; But still need to eliminate waste; When blood water concentration is low; This is detected by osmoreceptors; In hypothalamus; ADH [Anti-diuretic hormone] is released; From pituitary; Acts on collecting ducts; Makes them more permeable to water; More water is reabsorbed; Making urine concentration high</p> <p style="text-align: right;"><i>Any 5 for 1 mark each</i></p>	(5) (AO2)	5
(ii)	<p>Maintain blood pressure; Maintain appropriate blood concentrations of biochemicals; [owtte] for temperature regulation</p>	(1) (AO2) (1) (AO2)	2

Total Mark: 21

Question 4

(a)	Glucose	(1) (AO1)	1
(b)(i)	glycolysis	(1) (AO1)	1
(ii)	A (chemical) energy store	(1) (AO1)	1
(c)	Lactic acid/lactate	(1) (AO1)	1

Total Mark: 4**Question 5**

(a)(i)	<u>Subject fasts for 12 hours;</u> Subject sits at rest; Wears apparatus/respirometer; Total amount of oxygen used by the subject is measured; Oxygen consumed can be used to calculate BMR <i>4 for 1 mark each</i>	(4) (AO1)	4
(ii)	Subject does not have to stay in one room/could be carried out in subject's home setting/convenience	(1) (AO2)	1
(b)	has greater surface area; Therefore will lose heat faster; Than the shorter athlete of the same body mass	(1) (AO2) (1) (AO2)	2
(c)(i)	Older males have lower BMR than the young/ converse; Males have higher BMR than females/converse <i>Any 2 for 1 mark each</i>	(2) (AO2)	2
(ii)	Children have greater BMR because they are growing; Children have large SA:Vol ratio Men > BMR than women because have > muscle mass ; Therefore have more mitochondria <i>Any 3 for 1 mark each</i>	(3) (AO2)	3

Total Mark: 12**Question 6**

(a)(i)	Plot points correctly Join points correctly	(1) (AO3) (1) (AO3)	2
(ii)	35 °C; highest rate of reaction	(1) (AO3) (1) (AO3)	2
(b)(i)	Use same amount of substrate ; Use same amount of maltase ; Have selection of pH values ; Incubate for same time ; Measure production of product ;	(1) (AO3) (1) (AO3) (1) (AO3) (1) (AO3) (1) (AO3)	5
(ii)	No product would be produced	(1) (AO3)	1

Total Mark: 10

Question 7

(a)	Reduction of mucus; Would reduce the protection; Increased acid production; Increased protease production Would damage the lining; <i>Maximum of 4 marks</i>	(1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2)	4
(b)(i)	Emulsifies fats	(1) (AO1)	1
(ii)	Increases surface area for digestion of fats; Helps neutralise stomach acids;	(1) (AO1) (1) (AO1)	2
(c)	Avoid acidic foods; These will aggravate the problem Consume fatty foods; Provide a protective lining to the stomach; Give stomach lining time to repair itself <i>Maximum of 4 marks</i>	(1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2)	4
(d)	Increase energy intake slightly To meet metabolic demand of pregnancy Increase calcium; Contribute to growing <u>skeleton</u> of foetus Increase proteins; Contribute to growing foetus; Eliminate alcohol; Prevent damage to foetal <u>brain</u> Iron consumption <i>Maximum of 4 marks</i>	(1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2)	4

Total Mark: 15