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General Certificate of Education

Applied Science 8771/8773/8776/8779

SC14 The Healthy Body

Mark Scheme

2008 examination – January series

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Question 1

(a)(i)	Thyroid	(1) (AO1)	**1**
(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; *Any 2 for 1 mark each*	(1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1)	**2**
(b)(i)	Iodine needed to make thyroxine	(1) (AO1)	**1**
(ii)	Maintenance of blood volume; Nerve conduction;	(1) (AO1) (1) (AO1)	**2**
(iii)	Muscle cramps; Loss of appetite	(1) (AO1) (1) (AO1)	**1**
(iv)	Aldosterone; a mineralocorticoid; Released from adrenal glands/adrenal cortex; Stimulates distal convoluted tubules/kidney tubules; to reabsorb Na^+ ions; from filtrate; Also stimulates Na^+ ions resorption from saliva; perspiration/sweat glands; gastric juices	(1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1)	**4**

Total Mark: 11

Question 2

(a)	1 mark for identifying mitochondria	(1) (AO2)	**1**
(b)	***Question is incorrect, please see Examiner Report. This mark has not been included in the final total of the paper.***		
(c)	(10 x 3 ATP) + (2 x 2 ATP) = 34 ATP	(1) (AO2) (1) (AO2)	**2**
(d)	Broken down to glycerol; and fatty acids glycerol is used to generate pyruvate; fatty acids used to generate $NADH/FADH_2$; and pyruvate	(1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2)	**4**

Total Mark: 7

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Question 3

(a)	1 mark for correct identification of a coronary artery	(1) (AO2)	**1**
(b)	Heart tissue may die; any sensible suggestion	(1) (AO1)	**1**
(c)(i)	Pulse oximeter	(1) (AO1)	**1**
(ii)	Non invasive	(1) (AO1)	**1**
(iii)	98%	(1) (AO2)	**1**
(iv)	Sigmoid curve; To right of existing curve	(1) (AO2) (1) (AO2)	**2**
(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) (1) (AO1)	**5**

Total Mark: 12

Question 4

(a)	Kill harmful bacteria	(1) (AO2)	**1**
(b)(i)	289 x 800 = 2312 kJ *for 1 mark* 2.31 MJ *for 1 mark*	(1) (AO2) (1) (AO2)	**2**
(ii)	90/34 = 2.65 times	(1) (AO2)	**1**
(iii)	9 – 11 mg / 100ml blood	(1) (AO1)	**1**
(iv)	17 x 7.2 = 122.4 *for 1 mark* *(*122.4/289)x 100 = 42.35% *for 1 mark*	(1) (AO2) (1) (AO2)	**2**
(v)	Lower; allow ecf	(1) (AO2)	**1**
(c)(i)	Mother's milk does not supply enough nutrients for the baby at around 6 months	(1) (AO2)	**1**
(ii)	Iron ; any sensible suggestion Vitamin C ; any sensible suggestion	(1) (AO2) (1) (AO2)	**2**
(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)	**2**

Total Mark: 13

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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)	**5**
(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)	**4**
(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)	**5**

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)	**3**
(b)(i)	J	(1) (AO3)	**1**
(ii)	D Low haematocrit;and haemoglobin; Indicative of low iron/anaemia; Low oxygen carrying capacity; Accept explanation for athelete J for 3 marks	(1) (AO2) (1) (AO2) (1) (AO2) (1) (AO2)	**4**
(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)	**4**
(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)	**3**

Total Mark: 15

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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)	**2**
(b)	Alternate contraction; Of longitudinal and circular; smooth muscle; layers;	(1) (AO1) (1) (AO1)	**3**
(c)(i)	Needed for NAD+ synthesis ; dilates peripheral blood vessels	(1) (AO1) (1) (AO1)	**1**
(ii)	Pellagra; loss of weight; photosensitivity; skin ulcers;	(1) (AO1) (1) (AO1) (1) (AO1) (1) (AO1)	**1**

Total Mark: 7

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