



General Certificate of Education

Applied Science

8771/8773/8776/8779

SC14 The Healthy Body

Mark Scheme

2007 examination - January series

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Question 1

(a)	Allow you to see where you are missing brushing your teeth owtte	(1)(AO1)	1								
(b)	INCISORS: slicing/cutting/tearing food – reject bite MOLARS: crushing/grinding food/chew	(1)(AO1) (1)(AO1)	2								
(c)	The chemical/substance an enzyme reacts with.....owtte	(1)(AO1)	1								
(d)	Any 3 for 1 mark each Stomach is acidic/acid environment/has a low pH Amylase not active at acidic/low pH Cannot bind substrate; active site altered Becomes denatured	(3)(AO2)	3								
(e)	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Secretion</td> <td style="width: 50%;">Function</td> </tr> <tr> <td>Mucus</td> <td>Protects stomach lining</td> </tr> <tr> <td>Pepsin/protease (reject enzymes)</td> <td>Digests proteins</td> </tr> <tr> <td>Hydrochloric acid/HCl/acid</td> <td>Kills bacteria</td> </tr> </table>	Secretion	Function	Mucus	Protects stomach lining	Pepsin/protease (reject enzymes)	Digests proteins	Hydrochloric acid/HCl/acid	Kills bacteria	(1)(AO1) (1)(AO1) (1)(AO1)	3
Secretion	Function										
Mucus	Protects stomach lining										
Pepsin/protease (reject enzymes)	Digests proteins										
Hydrochloric acid/HCl/acid	Kills bacteria										

Total Mark: 10

Question 2

(a)	High in fibre; prevention of constipation Low in fat; older people have slower metabolic rate High in complex carbohydrates; provide slow release of energy Low in salt; reduces risk of hypertension; high iron	(1)(AO2) (1)(AO2) (1)(AO2) (1)(AO2)	4
(b)	$468 / 8266 \times 100 = 5.66\%$ Accept 5.6 – 5.7%	(2)(AO2)	2
(c)	$(16.1 \times 100) / 115 = 14 \text{ mg} / (4.8 \times 100) / 35 = 13.7 \text{ mg}$	(2)(AO2)	2

Total Mark: 8

Question 3

(a)	Client D diet is low in fats and proteins Eating oily fish will provide protein; for growth repair; immune function And unsaturated fat Eating pulses will provide proteins will reduce carbohydrate/too much carbohydrate	(1)(AO2) (1)(AO2) (1)(AO2) (1)(AO2)	4
(b)	Diet is high in percentage fat Also high in proteins excluding the foods mentioned should reduce the intake of fat And protein; reduce risk of obesity/CHD/high cholesterol	(1)(AO2) (1)(AO2) (1)(AO2) (1)(AO2)	4

Total Mark: 8

Question 4

(a)	Test a urine sample Use a dipstick test/clinistix/diastix Compare the result with a colour chart or accept similar description of fingerprick blood test Reject any reference to Benedicts	(1)(AO2) (1)(AO2) (1)(AO2)	3
(b)(i)	Beta cells/ β -cells In the Islets of Langerhans Of the pancreas Reject hypothalamus	(1)(AO2) (1)(AO2)	2
(ii)	Release insulin Into the blood Convert glucose to glycogen	(1)(AO2) (1)(AO2)	2
(iii)	Liver/muscle cells – reject skin Insulin stimulates conversion of glucose to glycogen/fat	(1)(AO2) (1)(AO2)	2
(c)(i)	The person should fast; so their baseline glucose levels can be determined A pre-test blood sample should be taken; to get the baseline level A known volume of glucose needs to be consumed; to make a fair test The drink needs to be consumed in a given period of time; so that a bolus of glucose is delivered Blood samples need to be taken at regular intervals; for 2 hours (approx)	(1)(AO3) (1)(AO3) (1)(AO3) (1)(AO3) (1)(AO3)	5
(ii)	Line peaks in early part of graph (first third) then returns to normal by end of graph Reject if line goes to zero	(1)(AO3)	1
(d)(i)	High in (simple) sugars High in saturated fat; cholesterol Low in fibre Low in vitamins & minerals	(1)(AO2) (1)(AO2) (1)(AO2)	3
(ii)	Release glucose into the blood over a longer period of time Avoid peaks of glucose concentrations Reduces demand for insulin production	(1)(AO1) (1)(AO1)	2

Total Mark: 20

Question 5

(a)(i)	$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$	(2)(AO1)	2
(ii)	(Skeletal) muscle Need for ATP for muscle contraction	(1)(AO1) (1)(AO2)	2
(b)(i)	Breakdown of glucose	(1)(AO1)	1
(ii)	The cytoplasm	(1)(AO1)	1
(iii)	ATP/adenosine tri-phosphate	(1)(AO1)	1
(iv)	This is where Krebs cycle takes place/link reaction	(1)(AO1)	1
(c)(i)	Fats/proteins Reject any reference to carbohydrates	(1)(AO1)	1
(ii)	Fat/protein – any sensible suggestion Reject any reference to carbohydrate	(1)(AO1)	1
(d)	Were respiring anaerobically; not using O_2 To generate sufficient ATP	(1)(AO2) (1)(AO2)	2

Total Mark: 12**Question 6**

(a)	Surface area is reduced Reduces amount of oxygen available for diffusion into blood	(1)(AO2) (1)(AO2)	2
(b)(i)	Eight	(1)(AO1)	1
(ii)	L marked in RHS third of x-axis	(1)(AO1)	1
(iii)	Curve drawn to the right of original	(1)(AO1)	1
(iv)	Makes blood more acidic/reduces pH So Hb gives up O_2 at higher pO_2	(1)(AO2) (1)(AO2)	2
(v)	Chemoreceptors detect fall in pH Impulses sent to respiratory centre in medulla/brain Increased rate of impulses To respiratory muscles/diaphragm/intercostals Increases breathing rate Breathe out/blow off excess CO_2 Accept similar description of stages/control for increasing heart rate	(1)(AO1) (1)(AO1) (1)(AO1) (1)(AO1)	4

Total Mark: 11

Question 7

(a)	Group A consuming 500 cm ³ have a low urine output; this remains low for the duration of the experiment	(1)(AO3)	4
	Group B consuming 1500 cm ³ have a higher urine output this peaks at 1 hours;	(1)(AO3)	
	and is maintained for the duration of the experiment	(1)(AO3)	
	Group C have virtually no urine output; as they consumed no water;	(1)(AO3)	
	Accept sensible comments on design of experiment	(1)(AO3)	
(b)(i)	They will have decreased their blood volume; prevent H ₂ O loss	(1)(AO2)	1
(ii)	ADH is released when blood volume falls; from hypothalamus	(1)(AO1)	4
	Has action on the cells of collecting ducts;	(1)(AO1)	
	Leads to insertion of pores/aquaporins into cells;	(1)(AO1)	
	Facilitated diffusion of water from urine back into blood;	(1)(AO1)	
(c)	Nerve conduction/generation of action potentials	(1)(AO1)	2
	Normal heart function		
	Maintenance of osmotic pressure of blood plasma/hydration	(1)(AO1)	

Total Mark: 11