



**GCSE Human Physiology and Health**

**Higher Tier**

**3417/H**

**MARK SCHEME**

**June 2008**

**Question 1**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)(i)	<b>X</b> – triceps	allow extensor and flexor for <b>1</b> mark	1
	<b>Y</b> – biceps		1
(ii)	<b>X</b> / extensor / triceps relaxes		1
	<b>Y</b> / flexor / biceps contracts		1
(iii)	<b>A</b> – ligament		1
	holds bones together	allow prevents dislocation	1
	<b>B</b> – synovial fluid		1
	helps smooth movement / lubricant / ‘shock absorber’ / cushions bones / reduces friction / owtte	ignore easier to move	1
	<b>C</b> – cartilage		1
	prevents bones rubbing / reduces friction / ‘shock absorber’ / cushions bones / owtte		1
total			10

**Question 2**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• temperature</li> <li>• amount / volume of starch</li> <li>• amount / volume of amylase</li> <li>• amount / volume of iodine</li> </ul>		2
(b)	6 correct plots  correct dot to dot <b>or</b> smooth curve	subtract <b>1</b> mark for each incorrect plot  tolerance $\pm$ half a small square  allow acceptable line of best fit that starts at first point and finishes at sixth point	3  1
(c)	starch and iodine solution is blue  amylase breaks down/digests starch  sugar / maltose produced  sugar and iodine solution is colourless; no starch (to form blue colour)	allow glucose  allow no reaction between sugar and iodine	1 1 1 1
(d)	time decreases then increases  correct reference to figures from graph  optimum / works quickest at pH 7  correct reference to denaturing of enzyme	do <b>not</b> allow descriptions of what is happening on each side alone      max <b>2</b> for description	1 1 1 1
total			14

**Question 3**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)(i)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• (dissolved) in rainwater</li> <li>• washed out of soil / run off / leaching</li> <li>• drift into river from crop spraying</li> </ul>	ignore references to insects allow any other sensible explanation	2
(ii)	5000		1
(iii)	any <b>three</b> from: <ul style="list-style-type: none"> <li>• low concentrations are not harmful (to plants) <b>or</b> insecticide not designed to kill plants</li> <li>• <u>builds up</u> along the food chain</li> <li>• is not excreted / stays in body</li> <li>• high concentration / <u>level</u> of DDT <u>toxic</u> / <u>poisonous</u> to birds</li> </ul>	allow cannot enter plant cells allow reference to figures	3
(b)(i)	27-29 (%)		1
(ii)	60 (%)		1
(iii)	P falls (below 80%) most quickly / quicker	comparison needed	1 1
total			10

**Question 4**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)	child(hood)	allow infancy	1
	adult(hood)		1
(b)(i)	84-86 (cm)		1
(ii)	0 to 2		1
(iii)	8 to 12 <b>or</b> 16 to 20		1
(iv)	males – 14 – 16	allow any two year period between 12 and 16	1
	females – 10 – 12		1
total			7

**Question 5**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)(i)	<b>A</b> – iris		1
	<b>C</b> – lens		1
	<b>D</b> – <u>suspensory</u> ligaments		1
(ii)	Cornea / <b>B</b>	either order	1
	Lens / <b>C</b>		1
(iii)	ciliary muscles contract		1
	suspensory ligaments become slack / loose / less tension		1
	lens becomes thicker / fatter / bulges / rounder	allow wider	1
(b)	any <b>three</b> from: <ul style="list-style-type: none"> <li>• correct reference to iris</li> <li>• circular muscles contract</li> <li>• radial muscles relax</li> <li>• pupil becomes smaller / shrinks <b>or</b> iris becomes wider</li> </ul>		3
total			11

**Question 6**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)	<p>any <b>three</b> from:</p> <ul style="list-style-type: none"> <li>• chemical substance</li> <li>• changes / alters (chemical processes in) the body</li> <li>• taken in owtte</li> <li>• valid effect of a drug : addictive / depressant / medicine / named drug</li> </ul>	<p>not just illegal / legal</p> <p>do <b>not</b> allow affects the brain unqualified</p>	3
(b)	<p>any <b>four</b> from:</p> <ul style="list-style-type: none"> <li>• depressant</li> <li>• slows reactions / reflexes</li> <li>• impaired judgement / memory / overconfident / lack of self control / reduces inhibitions</li> <li>• affects balance / vision / speech <b>or</b> reduces coordination / falling over</li> <li>• may harm the unborn fetus</li> <li>• unconsciousness / coma / death / brain damage</li> <li>• liver damage / failure</li> </ul>	<p>The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme. Use of at least <b>2</b> technical terms in the correct context eg – coordination, reaction, depressant, brain, nervous system, liver, fetus, cirrhosis</p> <p>ignore reference to cancer</p> <p>allow cirrhosis</p>	<p>1</p> <p>4</p>
total			8

### Question 7

	answers	extra information	mark
(a)	glucose, carbon dioxide / water water / carbon dioxide	all three required	1
(b)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• movement/muscular contraction</li> <li>• body temperature / keeping warm</li> <li>• growth / cell division</li> <li>• repair</li> </ul>	allow example of movement  not reproduction  allow active transport for <b>1</b> mark	2
(c)	any <b>five</b> from: <ul style="list-style-type: none"> <li>• reference to diffusion</li> <li>• from alveoli / to blood</li> <li>• into red blood cell</li> <li>• combines with haemoglobin</li> <li>• oxyhaemoglobin</li> <li>• carried in blood / circulation</li> <li>• reference to capillaries</li> <li>• through cell membrane</li> </ul>	allow reference to diffusion once only  allow attaches / associates / gains do not allow carries  allow description	5
total			8



**Question 8**

	<b>answers</b>	<b>extra information</b>	
(a)	any <b>four</b> from: <ul style="list-style-type: none"> <li>• <b><u>diaphragm</u></b> muscles contracts</li> <li>• <b><u>intercostal muscles</u></b> contract</li> <li>• ribs/thorax moves up and out</li> <li>• increase in <b><u>volume</u></b> (of lungs / thorax)</li> <li>• <b><u>pressure</u></b> falls lower than outside</li> <li>• air pushed in from the outside</li> </ul>	allow diaphragm contracts and flattens       do <b>not</b> allow sucked / pulled in	4
(b)(i)	provides support / prevents collapse of trachea / keeps trachea open	do <b>not</b> allow protection	1
(ii)	reference to movement of mucus / bacteria / dust away from lungs / owtte  (mucus) traps bacteria/dust/dirt	do <b>not</b> allow cilia trap and move bacteria	1  1
total			7

**Question 9**

	answers	extra information	mark
(a)(i)	4 to 1	allow 1 : 4	1
(ii)	1 – B	allow $X^B Y$	1
	12 –Bb	allow $X^B X^b$	1
	14 –bb	allow $X^b X^b$	1
(iii)	males need only inherit one allele	allow gene	1
(b)	$\begin{array}{cc} 9 & 10 \\ X^B X^b & X^B Y \end{array}$	<b>1 mark for alleles</b> <b>1 mark for chromosomes linked correctly to 9 and 10</b>	2
	$X^B \quad X^b \quad X^B \quad Y$		1
	$X^B Y \quad X^B X^B \quad X^b Y \quad X^B X^b$		1
	male    female    male    female normal   normal   colour blind   normal		1
		allow correct derivation of gametes from given parents ( <b>1 mark</b> )	
		allow correct derivation of offspring from gametes ( <b>1 mark</b> )	
total			10

**Question 10**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)	<b>P</b> – relay neurone	allow intermediate	1
	<b>Q</b> – motor neurone	allow efferent neurone	1
	<b>R</b> – sensory neurone	allow afferent neurone	1
(b)		The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme Any <b>2</b> points in correct sequence	1
	any <b>four</b> from: <ul style="list-style-type: none"> <li>• stimulus detected by receptor (in skin)</li> <li>• reference to impulses</li> <li>• along sensory to relay</li> <li>• along relay to motor</li> <li>• reference to synapse</li> <li>• reference to effector</li> <li>• muscle contracts (to pull arm away)</li> </ul>	allow reference to synapse once only allow sensory nerve ending ) ) allow sensory to spinal to motor for 1 ) mark	4
total			8

**Question 11**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)(i)	18 (°C)		1
(ii)	horizontal line between 36 and 38 (°C)		1
(b)	<p>any <b>five</b> from:</p> <ul style="list-style-type: none"> <li>• vasoconstriction / description</li> <li>• less blood to skin/surface / capillaries</li> <li>• less sweat / sweat glands less active</li> <li>• so less heat is lost</li> <li>• reduced evaporation / conduction / convection / radiation</li> <li>• reference to insulation / clothing / warm room</li> <li>• reference to reducing surface area</li> </ul>	<p>do <b>not</b> allow capillaries</p> <p>allow more blood within core circulation</p> <p>ignore references to hairs</p>	5
total			7

**Question 12**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)	correct base pairs – <b>C – G</b> <b>T – A</b> <b>C – G</b> <b>T – A</b>		1
(b)	order of bases is code  which controls order of amino acids (in a protein) owtte		1  1
(c)	two sides of molecule separate  each acts as a template / description  2 identical molecules formed	ignore references to cell division throughout	1  1  1
total			6

**Question 13**

	answers	extra information	mark																
(a)	A – aorta		1																
	B – vena cava		1																
(b)	1 mark each correct column;		3																
	<table border="1"> <thead> <tr> <th>Structure</th> <th>Urea</th> <th>Glucose</th> <th>Protein</th> </tr> </thead> <tbody> <tr> <td>Blood vessel A</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Blood vessel B</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>Ureter</td> <td>x</td> <td>x</td> <td>√</td> </tr> </tbody> </table>	Structure	Urea	Glucose	Protein	Blood vessel A	√	√	√	Blood vessel B	√	√	√	Ureter	x	x	√		
Structure	Urea	Glucose	Protein																
Blood vessel A	√	√	√																
Blood vessel B	√	√	√																
Ureter	x	x	√																
(c)		The answer to this question requires ideas in good English in a sensible order with: Correct use of scientific terms. Correct use of any two technical terms in the correct context eg dialysis, membrane, diffusion, molecule, selectively permeable, blood, urea, salts. Quality of written communication should be considered in crediting points in the mark scheme.	1																
	<p>any <b>five</b> from:</p> <ul style="list-style-type: none"> <li>• blood <b>and</b> dialysis fluid</li> <li>• separated by membrane/tube</li> <li>• membrane/tube selectively permeable</li> <li>• diffusion</li> <li>• of waste material/example</li> <li>• of excess water / (mineral) salts</li> <li>• correct direction</li> <li>• membrane prevents diffusion of large molecules / blood cells</li> </ul>	<p>allow partially permeable</p> <p>ignore semi-permeable</p> <p>ignore reference to glucose</p>	5																

**Question 13 continued on next page...**

**Question 13 continued...**

(d)	any <b>three</b> from: <ul style="list-style-type: none"><li>• (transplant) permanent solution</li><li>• no need for regular (dialysis)treatments</li><li>• example of less restricted lifestyle</li><li>• risk of operation</li><li>• difficulty in finding donor kidney / example</li><li>• risk of rejection</li><li>• need for regular drug treatment</li></ul>	3
total		14