

Question Number	Answer	Acceptable answers	Mark
<b>1(a)(i)</b>	A		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(a)(ii)</b>	Hypothalamus	Accept alternative spellings e.g. hypothalamus / hyperthalamus	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(b)</b>	<p>A description linking <b>two</b> of the following points:</p> <ul style="list-style-type: none"> <li>• erector muscles in the skin contract (1)</li> <li>• cause the hair to rise to trap air close to the skin to reduce heat loss / insulates skin (1)</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• sweat glands release water / sweat (1)</li> <li>• evaporates and cools the skin (1)</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• (brief description of) vasodilation or vasoconstriction (1)</li> <li>• method of control (1)</li> </ul>	<p>hairs on the surface of the skin stand on end</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(c)</b>	<p>An explanation linking <b>two</b> of the following points</p> <ul style="list-style-type: none"> <li>• in order for the enzymes to be most effective / best /optimum temperature for enzymes to work (1)</li> <li>• for chemical reactions to happen (1)</li> <li>• at too high temperatures enzymes are denatured (1)</li> </ul>	<p><b>Accept</b> named enzyme</p> <p>Accept named chemical reaction</p> <p>ORA at colder temperatures enzymes are less active</p>	<b>(2)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*1(d)</b>	<p>An explanation linking some of the following points:</p> <ul style="list-style-type: none"> <li>• vasodilation and vasoconstriction help control body temperature</li> <li>• in vasodilation more warm blood flows near the surface of the skin</li> <li>• as the shunt valve stops blood flowing by another route</li> <li>• more heat can be radiated or convected from the skin</li> <li>• body temperature is reduced</li> <li>• in vasoconstriction less blood flows near the surface of the skin</li> <li>• as it flows through the shunt valve</li> <li>• body temperature returns to normal</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content	
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• a limited explanation of thermoregulation although the processes of vasodilation and vasoconstriction are not mentioned</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>	
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• a simple explanation of either vasodilation or vasoconstriction this may be a description but not include the words vasodilation and vasoconstriction</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>	
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed explanation of both vasodilation and vasoconstriction including references to either the method of heat loss or the role</li> <li>• there is coherent flow of content and accurate use of scientific terminology to explain thermoregulation</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>	

**(Total for question 1 = 12 marks)**

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(i)</b>	<p>A description including the following points:</p> <ul style="list-style-type: none"> <li>as mean mass increases so does the percentage of population with type 2 diabetes (1)</li> <li>correct readings from the graph to illustrate the comparative point (1)</li> </ul>	<b>accept</b> positive correlation ORA	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(ii)</b>	<p>A suggestion linking <b>two</b> of the following:</p> <ul style="list-style-type: none"> <li>increasing body mass leads to over weight / obesity</li> <li>don't respond to insulin / reference to insulin resistance</li> </ul>		<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)(i)</b>	<p>Calculation</p> $(1.7 \times 1.7) = 2.89 \text{ (1)}$ $78 / 2.89$ $= 27 \text{ (1)}$	<p>Two marks for correct bald answer</p> <p>Ecf for incorrect numbers but correct calculation</p> <p>26.98 / 26.9</p> <p>Accept continued decimal places</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)(ii)</b>	<b>C</b> <input checked="" type="checkbox"/> overweight		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)</b>	<p>A description linking <b>three</b> of the following:</p> <ul style="list-style-type: none"> <li>• glucagon is released (1)</li> <li>• from the pancreas (1)</li> <li>• glycogen to glucose (1)</li> <li>• in the liver / muscle cells(1)</li> <li>• which acts to raise blood glucose levels (1)</li> </ul>	<p>correct spelling of glycogen and glucagon only</p> <p>No mark for glucagon is injected</p> <p>Ignore references to glucagon turning into glucose</p>	<b>(3)</b>

Total for question 2 – 10 marks

Question number	Answer	Mark
3(a)(i)	<ul style="list-style-type: none"> <li>person 2 had a slightly higher blood glucose level than person 1 after fasting (by up to 0.2 mmols/l) (1)</li> </ul>	(1)

Question number	Answer	Mark
3(a)(ii)	<ul style="list-style-type: none"> <li>person 3 had a much higher blood glucose level than person 1 two hours after taking glucose (up by up to 5.6 mmols/l) (1)</li> </ul>	(1)

Question number	Answer	Mark
3(a)(iii)	Insulin	(1)

Question number	Answer	Mark
3(b)(i)	<p>An answer that combines points of interpretation/evaluation to provide a logical description:</p> <ul style="list-style-type: none"> <li>levels remain low up until day 14 then rise (1)</li> <li>they continue to rise to day 23 and drop at day 24 (1)</li> </ul>	(2)

Question number	Answer	Mark
3(b)(ii)	<p>An explanation that combines identification – understanding (1 mark) and reasoning/justification – understanding (1 mark):</p> <ul style="list-style-type: none"> <li>as ovulation occurs (1)</li> <li>the levels of progesterone released from the corpus luteum increases to maintain the lining of the uterus (1)</li> </ul>	(2)

Question number	Answer	Mark
3(b)(iii)	<p>An explanation that combines identification via a judgment (1 mark) to reach a conclusion via justification/reasoning (1 mark):</p> <ul style="list-style-type: none"> <li>progesterone levels fall after day 23 to 17.11 (1)</li> <li>so uterus wall thickness is not maintained and therefore pregnancy has not occurred (1)</li> </ul>	(2)

Question Number	Answer	Acceptable answers	Mark
<b>4(a)</b>	<p>An explanation linking <b>four</b> of the following points:</p> <ul style="list-style-type: none"> <li>• (dehydration detected by) osmoreceptors/hypothalamus (1)</li> <li>• pituitary gland (1)</li> <li>• (releases more) ADH (1)</li> <li>• ADH acts on the nephron/collecting duct/tubules (1)</li> <li>• making the {collecting duct/tubules/nephron} more permeable (1)</li> <li>• so <b>more</b> water is reabsorbed (by the body/blood) (1)</li> </ul>	<p>ignore brain</p> <p>accept {small amount/concentrated} urine produced</p>	<b>(4)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)(i)</b>	<b>A</b> corpus luteum		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)(ii)</b>	<ul style="list-style-type: none"> <li>• uterus lining remains thick/uterus lining continues to grow (1)</li> </ul>		<b>(1)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>4(b)</b> <b>(iii)*</b>	<p>A explanation to include some of the following points</p> <p>Stages and hormones</p> <ul style="list-style-type: none"> <li>menstrual cycle consists of menstruation, uterus lining thickening and ovulation</li> <li>hormones involved in the menstrual cycle are oestrogen, progesterone, FSH and LH</li> </ul> <p>Role of the hormones</p> <ul style="list-style-type: none"> <li>FSH stimulates the follicles to mature</li> <li>FSH stimulates the production of oestrogen</li> <li>follicles secrete oestrogen</li> <li>oestrogen is responsible for the repair of the uterus wall</li> <li>high levels of oestrogen stimulate the release of LH</li> <li>LH triggers ovulation</li> <li>corpus luteum produces progesterone</li> <li>progesterone maintains the lining of the uterus</li> </ul> <p>Control mechanisms</p> <ul style="list-style-type: none"> <li>oestrogen inhibits the production of FSH</li> <li>progesterone inhibits the production of LH</li> <li>progesterone inhibits the production of FSH</li> <li>menstruation is triggered by low levels of oestrogen and progesterone</li> <li>Low progesterone levels cause FSH to be released</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content	
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>A limited explanation of the menstrual cycle which might include at least one of the stages <b>or</b> some of the hormones involved <b>or</b> the role of one of the hormones involved</li> <li>the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>spelling, punctuation and grammar are used with limited accuracy</li> </ul>	
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>A simple explanation of the menstrual cycle including some of the stages <b>and</b> the role of at least two of the hormones involved</li> <li>the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>spelling, punctuation and grammar are used with some accuracy</li> </ul>	
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>A detailed explanation of the menstrual cycle including most of the hormones involved, their roles <b>and</b> at least one control mechanism</li> <li>the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>spelling, punctuation and grammar are used with few errors</li> </ul>	

**(Total for question 4 = 12 marks)**