

Question Number	Answer	Mark						
<b>1(a)</b>	<table border="1"> <thead> <tr> <th>Region of the brain</th> <th>One role while she is on the beam</th> </tr> </thead> <tbody> <tr> <td>Cerebellum</td> <td>maintaining balance / coordination of movement / muscle control / eq ;</td> </tr> <tr> <td>Medulla oblongata</td> <td>regulation of {breathing / heart beat} / eq ;</td> </tr> </tbody> </table>	Region of the brain	One role while she is on the beam	Cerebellum	maintaining balance / coordination of movement / muscle control / eq ;	Medulla oblongata	regulation of {breathing / heart beat} / eq ;	<b>(2)</b>
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	Cerebellum	maintaining balance / coordination of movement / muscle control / eq ;						
Medulla oblongata	regulation of {breathing / heart beat} / eq ;							

Question Number	Answer	Mark
<b>1(b)</b>	<ol style="list-style-type: none"> <li>1. idea more blood flows near the skin surface / eq ;</li> <li>2. due to {vasodilation / dilation of arterioles / eq} ;</li> <li>3. {vasoconstriction / eq} of shunt vessels / eq ;</li> <li>4. more blood to capillaries / eq ;</li> <li>5. idea of more heat lost ;</li> <li>6. via radiation ;</li> </ol>	<b>(4)</b>

Question Number	Answer	Mark
<b>1(c)(i)</b>	<ol style="list-style-type: none"> <li>1. {in the knee / behind the knee cap} / {cross- shaped / two ligaments} ;</li> <li>2. (connective tissue that) connects bone to bone / eq ;</li> </ol>	<b>(2)</b>

Question Number	Answer	Mark
<b>1(c)(ii)</b>	<ol style="list-style-type: none"> <li>1. idea of smaller incision reduces chance of infection / eq ;</li> <li>2. idea of smaller incision reduces recovery time ;</li> <li>3. idea of smaller incision reduces likelihood of osteoarthritis / knee joint replacement later / eq ;</li> <li>4. idea of smaller incision so less scar tissue / eq ;</li> <li>5. idea of smaller incision so less blood loss / eq ;</li> <li>6. idea of smaller incision so less pain / eq ;</li> <li>7. use of local anaesthetic means less (associated) risk / eq ;</li> <li>8. idea of cheaper related to fewer staff needed ;</li> </ol>	<b>(2)</b>

Question Number	Answer	Mark
<b>2(a)(i)</b>	B ;	<b>(1)</b>

Question Number	Answer	Mark
<b>2(a)(ii)</b>	C ;	<b>(1)</b>

Question Number	Answer	Mark
<b>2(b)</b>	D ;	<b>(1)</b>

Question Number	Answer	Mark
<b>2(c)</b>	A ;	<b>(1)</b>

Question Number	Answer	Mark
<b>2(d)</b>	C ;	<b>(1)</b>

Question Number	Answer	Mark
<b>2(e)</b>	D ;	<b>(1)</b>

Question Number	Answer	Mark
<b>3 (a)</b>	1. high numbers of obese people / eq ; 2. this is linked to increased risk of diseases such as {diabetes / CVD / eq} ; 3. idea that this puts an economic burden on society ;	<b>(2)</b>

Question Number	Answer	Mark
<b>3 (b)</b>	1. three fatty acids ; 2. contains a glycerol (molecule) / ref. to ester bonds ;	<b>(2)</b>

Question Number	Answer	Mark
<b>3 (c)</b>	1. $80\% \times \{10 / 15 / 20\} \%$ OR $0.8 \times 0.1$ OR $0.8 \times 0.15$ OR $0.8 \times 0.2$ OR idea that percentage mortality has not changed ; 2. $0\%$ / $8\%$ / $12\%$ / $16\%$ / (range) 8 to $16\%$ ;	<b>(2)</b>

Question Number	Answer	Mark
<b>3 (d)</b>	<p>1. (serious) self reflection is associated with increased activity in the mPFC (in both) / eq ;</p> <p>Body image:</p> <p>2. there is a link between overweight body image in females and activation of mPFC / eq ;</p> <p>3. there is no (significant) mPFC activation in men when presented with equivalent male images /eq ;</p> <p>Words:</p> <p>4. {words / eq} associated with increased activation in the amygdala in females / eq ;</p> <p>5. (and) deactivation of the left mPFC in females / eq ;</p> <p>6. in men this response was reversed / eq ;</p>	<b>(4)</b>

Question Number	Answer	Mark
<b>3 (e)</b>	<p>1. idea that cortisol levels need to be high for a long time ;</p> <p>2. this leads to {high blood pressure / suppressed thyroid function / impaired immunity / increased intra-abdominal fat / CVD / diabetes / cancer} ;</p>	<b>(2)</b>

Question Number	Answer	Mark
<b>3 (f)</b>	<p>1. greater surface area / eq ;</p> <p>2. idea of more quickly hydrolysed (by enzymes) / eq ;</p> <p>3. to release energy / for use in respiration / eq ;</p>	<b>(2)</b>

Question Number	Answer	Mark
<b>3 (g)</b>	<ol style="list-style-type: none"> <li>1. UCP-1 is in the mitochondria / eq ;</li> <li>2. idea that electron transport chain is disrupted ;</li> <li>3. (therefore) less ATP is produced by the electron transport chain / eq ;</li> <li>4. UCP-1 might inhibit {ATP synthase / ATPase / eq } OR alter the proton gradient / eq ;</li> <li>5. more energy as heat / eq ;</li> </ol>	<b>(3)</b>

Question Number	Answer	Mark
<b>3 (h)</b>	<ol style="list-style-type: none"> <li>1. it only undergoes the first stage of metabolism / eq ;</li> <li>2. glucose is completely metabolised / eq ;</li> <li>3. idea that products of 18F-FDG breakdown cannot be metabolised ;</li> <li>4. idea that this is due to wrong shape for next enzyme ;</li> <li>5. (so) cannot bind to active site / binds permanently / eq ;</li> <li>6. idea that (altered shape means) cannot exit through the same glucose / eq channels they entered by ;</li> </ol>	<b>(3)</b>

Question Number	Answer	Mark
<b>3 (i)</b>	<ol style="list-style-type: none"> <li>1. fucoxanthin increases the production of UCP-1 / eq ;</li> <li>2. UCP-1 {uncouples / disrupts / eq} the electron transport chain / oxidative phosphorylation / eq ;</li> <li>3. less ATP available for use / eq ;</li> <li>4. more energy lost as heat / eq ;</li> <li>5. extra fat is used in {respiration / eq} ;</li> </ol>	<b>(3)</b>

Question Number	Answer	Mark
<b>*3 (j)</b>	<p><b>Take into account quality of written communication when awarding the following points.</b></p> <ol style="list-style-type: none"> <li>1. PRDM16 levels higher in BAT than WAT / eq ;</li> <li>2. loss of PRDM16 causes a loss in heat production / eq ;</li> <li>3. more energy stored as fat in WAT / eq ;</li> <li>4. (artificial) excess of PRDM16 causes white fat cells to become brown fat cells / eq ;</li> <li>5. this influences UCP-1 levels / eq ;</li> <li>6. genetically engineered mice had high levels of UCP-1 during BAT formation / eq ;</li> <li>7. increasing PRDM16 in muscle cells causes them to differentiate into brown fat cells / eq ;</li> <li>8. increased BAT as a result associated with increased { heat production / weight loss / fat loss / eq} / eq ;</li> </ol>	<b>(5)</b>

Question Number	Answer	Mark
<b>3 (k)</b>	<ol style="list-style-type: none"> <li>1. anorexia associated with a reduction in {CD68 expression / mRNA coding for fat synthesis / certain proteins / eq} / eq ;</li> <li>2. anorexia associated with an increase in resistin mRNA expression / eq ;</li> <li>3. {psychological distress / eq} leads to changes in DNA structure / methylation of DNA / eq ;</li> </ol>	<b>(2)</b>