

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

Question Number	Answer	Acceptable answers	Mark
<b>1(a)(ii)</b>	<b>C</b> In DNA, the bases A - T are complementary		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(b)</b>	<p>A definition including two of the following:</p> <ul style="list-style-type: none"> <li>• a sperm fuses with egg / penetrates the egg (1)</li> <li>• nuclei/genetic information fuses /combines (1)</li> <li>• reference to haploid gametes /gametes have 23 chromosomes (1)</li> <li>• reference to cell made being diploid / has 23 pairs of chromosomes / zygote formed (1)</li> </ul>	Ignore sperm meets egg	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(c)(i)</b>	<p>A description that includes the following:</p> <ul style="list-style-type: none"> <li>• (aerobic) respiration / using glucose / using oxygen (1)</li> <li>• energy released (for movement / swimming / metabolism)(1)</li> </ul>		<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(c)(ii)</b>	<p>An explanation including <b>two</b> of the following:</p> <ul style="list-style-type: none"> <li>• a change in a base/base sequence/order of bases / a change in mRNA (1)</li> <li>• named change e.g. addition/deletion (1)</li> <li>• reference to change in an amino acid / order of amino acids (1)</li> </ul>	<p>Accept codon, triplet, genetic code for base.</p> <p>substitution/deletion/other named gene mutation.</p>	<b>(2)</b>

**(Total for question 1 = 8 marks)**

Question Number	Answer	Acceptable answers	Mark
<b>2a (i)</b>	B – the glucose content of their blood		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2a (ii)</b>	<p>An explanation linking <b>three</b> of the following points:</p> <ul style="list-style-type: none"> <li>• (the hormone) insulin (1)</li> <li>• (insulin )is injected (into subcutaneous fat) (1)</li> <li>• use a low carbohydrate /healthy diet (1)</li> <li>• (increase) exercise (1)</li> <li>• to lower blood glucose levels / when blood glucose levels get too high / regulate glucose levels(1)</li> </ul>	use of epipen	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2b</b>	<p>Body Mass Index calculation:</p> <p><math>120/1.8^2</math> (1)</p> <p>37 (1)</p>	ecf for correct manipulation with incorrect figures	<b>(2)</b>

Question Number	Indicative Content	Mark
<b>QWC *2(c)</b>	<p>An explanation including the following points in a logical order:</p> <ul style="list-style-type: none"> <li>• a reflex response is an involuntary response</li> <li>• reflex responses do not involve the brain</li> <li>• reflex responses involve sensory neurones</li> <li>• reflex responses involve relay neurones</li> <li>• reflex responses involve motor neurones</li> <li>• relay neurones are in the spinal cord</li> <li>• impulses travel along neurones as electrical signals</li> <li>• the axon is insulated by the myelin sheath</li> <li>• which ensures the electrical signal does not lose energy</li> <li>• at the junction between two neurones there is a synapse</li> <li>• the message is carried across the synapse by neurotransmitters</li> <li>• the message travels from the stimulus along the axon and dendron of the sensory neurone to the spinal cord</li> <li>• the reflex arc is important to keep the body safe</li> </ul>	<b>(6)</b>
Level		No rewardable content
1	1-2	<ul style="list-style-type: none"> <li>• A limited written explanation of some of the neurones involved in the reflex arc or a limited explanation of how messages /impulses are transmitted as electrical signals</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>
2	3-4	<ul style="list-style-type: none"> <li>• A simple explanation of the neurones involved in the reflex arc in the correct order, with the method of transmission along neurones, one neurone may be missing <b>or</b> a detailed description of all of the neurones in the reflex arc and the role of the CNS</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and mostly uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>
3	5-6	<ul style="list-style-type: none"> <li>• A detailed explanation of the neurones involved in the reflex arc in the correct order, with the method of transmission along neurones including the role of the synapse and/or myelin sheath.</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>



Question Number	Answer	Acceptable answers	Mark
<b>3(a)(i)</b>	A		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(ii)</b>	A		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)</b>	<p>an explanation linking the following</p> <ul style="list-style-type: none"> <li>• from receptor (cells) / sense organ (1)</li> <li>• to the {brain / spinal cord / CNS / synapse / other neurone}(1)</li> <li>• as an <u>electrical</u> impulse (1)</li> </ul>	<p>Accept named sense organ</p> <p><u>electrical</u> message/signal Ignore references to current</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)</b>	<p>a description including <b>two</b> of the following</p> <ul style="list-style-type: none"> <li>• insulates (electrical signal) (1)</li> <li>• the axon (1)</li> <li>• speeds up the impulse (1)</li> </ul>	<p>ignore protects / protection</p> <p>accept message / signal for impulse</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(d)</b>	<p>a description including <b>three</b> of the following</p> <ul style="list-style-type: none"> <li>• receptor cells (pick up a stimulus) (1)</li> <li>• sensory neurone sends a message to the spinal cord / relay neurone / CNS (1)</li> <li>• the message travels from the relay neurone / CNS / spinal cord to the motor neurone (1)</li> <li>• (this initiates a response) in the effector / muscle / gland (1)</li> <li>• message travels across synapse (by neurotransmitters) (1)</li> </ul>	<p>accept the correct nerve pathway diagram for 3 marks</p> <p>accept nerve for neurone</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(a)</b>	<b>A</b> differentiate into any type of cell		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)</b>	<p>Any <b>two</b> structures from the list with at least <b>one</b> matched adaptation:</p> <p>Structures (maximum of 2)</p> <ul style="list-style-type: none"> <li>• biconcave shape (1)</li> <li>• no nucleus (1)</li> <li>• thin membrane (1)</li> <li>• flexible / small (1)</li> <li>• contains haemoglobin (1)</li> </ul> <p>(matched) adaptation (maximum of 2)</p> <ul style="list-style-type: none"> <li>• large surface area / increase oxygen uptake (1)</li> <li>• to increase amount of haemoglobin / oxygen-carrying capacity (1)</li> <li>• so short distance for diffusion (1)</li> <li>• to get through capillaries (1)</li> <li>• to bind oxygen (1)</li> </ul>		<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(c)</b>	<p>A description including <b>two</b> of the following points</p> <ul style="list-style-type: none"> <li>• clotting / to seal a wound / scab formed (1)</li> <li>• stop bleeding (1)</li> <li>• prevent infection / entry of microbes (1)</li> <li>• fibrin (1)</li> </ul>		<b>(2)</b>

Question Number	Indicative Content	Mark	
<b>QWC</b>	<b>*4d</b>	<p>A comparison between mitosis and meiosis including</p> <p><b>Mitosis</b></p> <ul style="list-style-type: none"> <li>• (genetically) identical cells produced</li> <li>• two daughter cells</li> <li>• one division</li> <li>• diploid daughter cells</li> <li>• identical set of chromosomes</li> <li>• occurs in the formation of body cells</li> <li>• for growth and repair (of body tissues)</li> </ul> <p><b>Meiosis</b></p> <ul style="list-style-type: none"> <li>• (genetically) non-identical cells</li> <li>• four daughter cells</li> <li>• 2 divisions</li> <li>• haploid daughter cells</li> <li>• half the number of chromosomes</li> <li>• occurs in the formation of gametes</li> <li>• for sexual reproduction</li> <li>• results in genetic variation</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 description including two points on either meiosis or mitosis there maybe confusion between the two but this does not negate the level</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 description including one comparison of meiosis and mitosis or a detailed description of either mitosis or meiosis</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 comparison of both meiosis and mitosis – at least two correct comparisons made</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>	