Question Number	Answer	Acceptable answers	Mark
1(a)(i)	nucleus (1)		(1)

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

Question Number	Answer	Acceptable answers	Mark
1(b)	<ul> <li>A definition including two of the following:</li> <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	(2)

Question Number	Answer	Acceptable answers	Mark
1(c)(i)	<ul> <li>A description that includes the following:</li> <li>(aerobic) respiration / using glucose / using oxygen (1)</li> <li>energy released (for</li> </ul>		
	movement / swimming / metabolism)(1)		(2)

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	An explanation including <b>two</b> of the following:		
	<ul> <li>a change in a base/base sequence/order of bases / a change in mRNA (1)</li> </ul>	Accept codon, triplet, genetic code for base.	
	<ul> <li>named change e.g. addition/deletion (1)</li> </ul>	substitution/deletion/other named gene mutation.	
	<ul> <li>reference to change in an amino acid / order of amino acids (1)</li> </ul>		
			(2)

## (Total for question 1 = 8 marks)

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

Question Number	Answer	Acceptable answers	Mark
2a (ii)	An explanation linking <b>three</b> of the following points:		
	<ul> <li>(the hormone) insulin (1)</li> <li>(insulin )is injected (into subcutaneous fat) (1)</li> <li>use a low carbohydrate /healthy diet (1)</li> </ul>	use of epipen	
	<ul> <li>(increase) exercise (1)</li> <li>to lower blood glucose levels / when blood glucose levels get too high / regulate glucose levels(1)</li> </ul>		(3)

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

Question Indicative Content		Indicative Content	Mark	
QWC *	2(c)	<ul> <li>An explanation including the following points in a logical order:</li> <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>	(6)	
Level		No rewardable content		
1	1-2	<ul> <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> <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> <li>A detailed explanation of the neurones involved in the reflex arc in</li> </ul>		
		<ul> <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	Answer	Acceptable answers	Mark
Number			
3(a)(i)	A		
			(1)

Question	Answer	Acceptable answers	Mark
Number			
3(a)(ii)	А		
			(1)

Question Number	Answer	Acceptable answers	Mark
3(b)	an explanation linking the following • from receptor (cells) / sense organ (1)	Accept named sense organ	
	<ul> <li>to the {brain / spinal cord / CNS / synapse / other neurone}(1)</li> <li>as an <u>electrical</u> impulse (1)</li> </ul>	<u>electrical</u> message/signal Ignore references to current	(2)

Question Number	Answer	Acceptable answers	Mark
3(c)	a description including <b>two</b> of the following		
	<ul> <li>insulates (electrical signal) (1)</li> </ul>	ignore protects / protection	
	<ul><li>the axon (1)</li><li>speeds up the impulse (1)</li></ul>	accept message / signal for impulse	(2)

		-	
Question Number	Answer	Acceptable answers	Mark
3(d)	<ul> <li>a description including three of the following</li> <li>receptor cells (pick up a stimulus) (1)</li> </ul>	accept the correct nerve pathway diagram for 3 marks	
	<ul> <li>sensory neurone sends a message to the spinal cord / relay neurone / CNS (1)</li> </ul>	accept nerve for neurone	
	<ul> <li>the message travels from the relay neurone / CNS / spinal cord to the motor neurone (1)</li> </ul>		
	<ul> <li>(this initiates a response) in the effector / muscle / gland (1)</li> </ul>		
	<ul> <li>message travels across synapse (by neurotransmitters) (1)</li> </ul>		(3)

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

Question Number	Answer	Acceptable answers	Mark
4(b)	Any <b>two</b> structures from the list with at least <b>one</b> matched adaptation: Structures (maximum of 2) <ul> <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>		
	<ul> <li>e) large surface area / increase oxygen uptake (1)</li> <li>e) to increase amount of haemoglobin / oxygen-carrying capacity (1)</li> <li>e) so short distance for diffusion (1)</li> <li>e) to get through capillaries (1)</li> <li>e) to bind oxygen (1)</li> </ul>		(3)

Question Number	Answer	Acceptable answers	Mark
<b>4</b> (c)	A description including <b>two</b> of the following points		
	<ul> <li>clotting / to seal a wound / scab formed (1)</li> </ul>		
	<ul> <li>stop bleeding (1)</li> </ul>		
	<ul> <li>prevent infection / entry of microbes (1)</li> </ul>		
	• fibrin (1)		(2)

Questi	Question Indicative Content		Mark
QWC	* <b>4</b> d	A comparison between mitosis and meiosis including Mitosis • (genetically) identical cells produced • two daughter cells • one division • diploid daughter cells • identical set of chromosomes • occurs in the formation of body cells • for growth and repair (of body tissues) Meiosis • (genetically) non-identical cells • four daughter cells • 2 divisions • haploid daughter cells • half the number of chromosomes • occurs in the formation of gametes • for sexual reproduction • results in genetic variation	(6)
Level	0	No rewardable content	
1	1 - 2	<ul> <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>	
2	3 - 4	<ul> <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>	
3	5 - 6	<ul> <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>	