Fig. 2.1 shows a reflex arc involving a finger and a muscle in the arm.

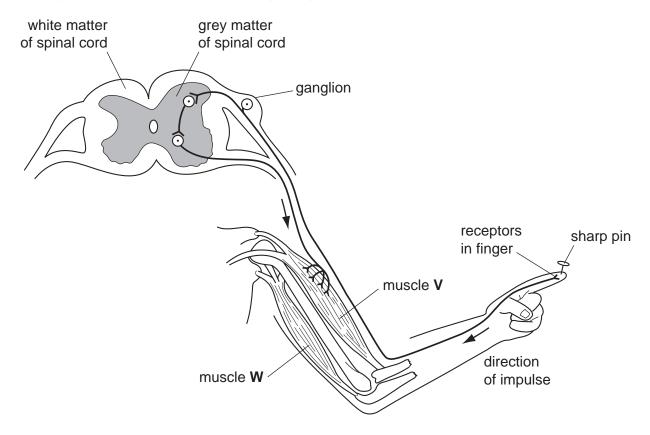


Fig. 2.1

(a) State two stimuli that can be detected by receptors in the finger.

	1.	
	2.	[2]
(b)	Using labels from Fig. 2.1, state the site of the cell body of	
	1. a sensory neuron	

[2]

2. a relay neuron

c) (i)	In what form are impulses transmitted in the nervous system?	
		[1]
(ii)	State the structure, present in many mammalian neurones, which reduces leakag of the impulse.	je
	[	[1]
(iii)	The impulse takes 0.02 seconds to pass from the finger to the spinal cord, distance of 1.5 metres. Calculate the speed of the impulse. Show your working.	а
	Speed[2	[2]
(iv)	Although the total distance the impulse travels in the reflex arc is less than metres, the time taken is more than 0.04 seconds. Suggest why the time taken is more than expected.	
		[1]
d) (i)	Describe what would happen to the muscle and the arm when muscle ${\bf V}$ receive the nerve impulse.	es:
		•••
		2]
(ii)	Explain how muscle <b>V</b> would return to its original position.	
		[2]

[Total: 13]

	omplete the table by stating two voescribed in the text above.	luntary actions and two involuntary action	ons
	voluntary actions	involuntary actions	
1.		1.	
2.		2	
			[4]
<b>(b)</b> A	ctions are caused by the stimulation of e	effectors.	
(i	Name the two different types of effec	etor in the body.	
	1		
	2		[2]
(ii	State the type of neurone that stimula		

(c)	Pla	nts also respond to stimuli such as light.	
	(i)	State the name of the response of plants to light.	
			[1]
	Ahr	med was provided with several young plant shoots and a sample of auxin.	
	(ii)	Describe an experiment he could carry out to show that auxin causes bending of shoot.	of a
			••••
			•••••
			••••
			[4]
	(iii)	Explain the mechanism that results in a shoot bending towards light.	
			••••
			••••
			 [3]
			[~]
(d)		nthetic plant hormones behave in a similar way to auxins. Describe how synthe nt hormones are effective as weedkillers.	etic
			[2]

[Total: 17]

3		ulin is a hormone produced to control blood glucose levels. Diabetics do not have a ural ability to control these levels.
	(a)	Define the term hormone.
	(b)	With reference to the pancreas and the liver, describe the role of insulin in controlling blood glucose levels.
		[4]
	(c)	<ul> <li>Insulin is a protein.</li> <li>Diabetics can control their blood glucose levels artificially by injecting insulin.</li> <li>Many medicines are swallowed as tablets.</li> </ul>
		Explain what would happen to the insulin in the stomach if it was swallowed as a tablet.
		[2]

into	the lungs as a spray. It is then absorbed into the bloodstream.
(i)	Suggest the path the spray would take from the mouth to enter the alveoli.
	[3]
(ii)	Suggest the process by which the insulin would pass from the alveoli into the bloodstream.
	[1]
(iii)	State three features of the alveoli that might help the insulin to pass into the blood stream efficiently.
	1.
	2.
	3. [3]
	[Total: 15]

(d) An alternative treatment to injecting insulin is being developed. The insulin is inhaled