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Neurones pass information around the body.

1	0
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Why are reflex reactions important?

[1 mark]

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1	0
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Caffeine is a drug found in coffee.

After a person drinks coffee information passes through neurones in the nervous system more quickly.

Suggest a hypothesis for the effect of caffeine concentration on reaction time.

[1 mark]

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**1 0** . **3** Two students investigated the effect of caffeine concentration on reaction time.

This is the method used.

- 1. Student **A** drinks a cup of coffee.
- 2. Student **B** holds a ruler above Student **A**'s hand.
- 3. Student **B** drops the ruler.
- 4. Student **A** catches the ruler as quickly as she can.
- 5. The distance the ruler falls is recorded.

Suggest how this method could be improved to produce valid results.

**[6 marks]**

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**END OF QUESTIONS**

**Question 10**

Question	Answers	Extra information	Mark	AO / Spec. Ref.
10.1	fast reaction to reduce / protect from harm	allow named examples	1	AO1/1 4.5.2
10.2	higher caffeine concentration causes shorter reaction time	allow converse  ignore 'faster / slower reaction time'	1	AO3/3a 4.5.2
10.3	<b>Level 3:</b> A coherent method is described with relevant detail, which demonstrates a broad understanding of the relevant scientific techniques and procedures. The steps in the method are logically ordered. The method would lead to the collection of valid results.		5–6	AO3/3b 4.5.2
	<b>Level 2:</b> The bulk of a method is described with mostly relevant detail, which demonstrates a reasonable understanding of the relevant techniques and procedures. The method may not be in a completely logical sequence and may be missing some detail.		3–4	
	<b>Level 1:</b> Discrete relevant points are made which demonstrate some understanding of the relevant scientific techniques and procedures. They may lack a logical structure and would not lead to the production of valid results.		1–2	
	No relevant content.		0	
	<b>Indicative content</b>  <ul style="list-style-type: none"> <li>• use decaffeinated coffee as control</li> <li>• control volume of coffee</li> <li>• blind trial or do not tell students which coffee they are drinking</li> <li>• left for standard time between drink and test</li> <li>• at least 10 minutes</li> <li>• control start position of ruler</li> <li>• control other factors such as light in the room</li> <li>• same person for different concentrations</li> <li>• repeat for each caffeine concentration</li> <li>• use a range of caffeine concentrations</li> <li>• start with lowest concentration of caffeine</li> <li>• use caffeine solution instead of coffee to control for other ingredients</li> <li>• repeat investigation with more people and calculate means</li> </ul>			
<b>Total</b>			<b>8</b>	