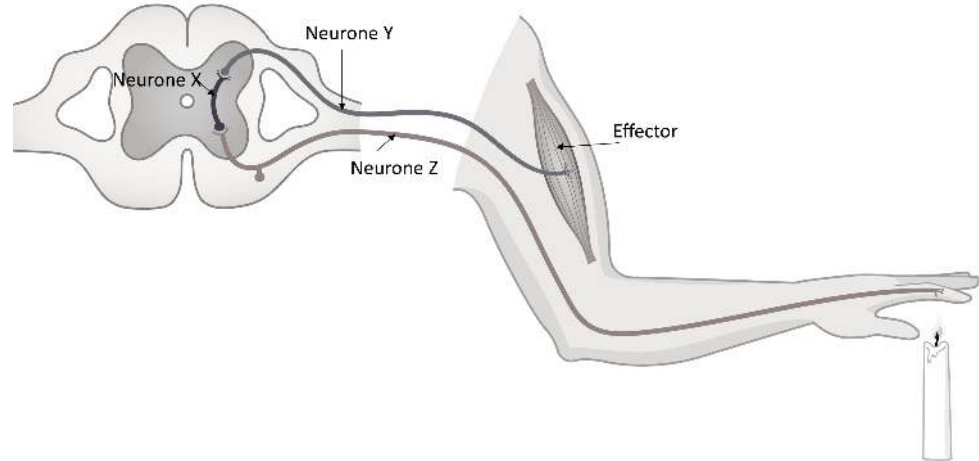


0	1
---	---

Figure 1 shows a reflex arc

Figure 1



0	1	.	1
---	---	---	---

What type of neurone is neurone X?

Tick **one** box.

a sensory neurone

a relay neurone

a motor neurone

0	1	.	2
---	---	---	---

There is a gap between each neurone. Which word best describes this gap?

Tick **one** box.

an effector

a synapse

a stimulus

0	1	.	3
---	---	---	---

Describe how information travels across this gap

Diffuses [1]; as a chemical messenger/neurotransmitter [1] [2 marks]

0	2	.	1
---	---	---	---

A response is formed when information in the nervous system reaches an effector

There are 2 different types of effector

Complete the table to show

* the 2 different types of effector

* the response of each type of effector

Effector	Response
1. muscle	contract
2. gland	release/secrete a chemical/hormone enzyme

[4 marks]

0	2	.	2
---	---	---	---

In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

A reflex action helps the body to protect itself from damage.

A person accidentally touches a very hot object. This starts a reflex action.

Describe as fully as you can, how a reflex action occurs.

0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content	There is a simple description of a reflex action with some of the cell types mentioned. There is no clear idea of the order of the parts or cells in the reflex arc.	There is a clear description of a reflex action which gives the order of most of the parts.	There is a detailed description of a reflex arc with all cells named in order. The type of impulse in the neurone and synapses is described

Some points that might be mentioned:

Stimulus or heat detected by temperature receptors in skin [1] Impulses travel along sensory neurones to spinal cord / CNS [1]

Chemical transmission across synapses [1] Through a relay neurone [1]

Impulses to muscle through a motor neurone [1] to an effector [1]

Muscle / effector contracts, moving the hand away [1]

0 3

A student carried out an investigation to compare their reaction time with and without caffeine. **[this is similar to one of the required practicals]**

With the forearm of their weaker hand resting on the end of a table and a 30cm ruler held vertically with the 0 cm mark in between the student's thumb and forefinger, another student, without warning would drop the ruler.

Where the ruler was caught during its fall would be read just below the thumb of the student who caught the ruler. This was repeated a further 4 times and an average was calculated. This was then repeated 30 minutes after drinking a caffeinated drink. The results of this investigation can be seen in the table below:

Test number	Distance a ruler dropped (cm)	
	before caffeine	after caffeine
1	11	6
2	12	5
3	10	5
4	9	4
5	9	15
Mean	10	X

0 3

1

From the data above, identify the anomalous result and give a reason for choosing this answer

15(cm) at repeat 5 [1] this was a much higher number that the other readings/

did not fit the pattern [1]

[2 marks]

0 3

2

Calculate an accurate value for X in the table, show your working

1 mark for showing an understanding of calculating mean: $6 + 5 + 5 + 4 = 20$

2nd mark for excluding the anomaly: $20/4 = 5\text{cm}$ (units needed) [2 marks]

0 3

3

State 2 control variables from the method

arm position [1]; same hand [1]; 30 minutes wait after drinking caffeine [1];

starting position of the ruler [1] [2 marks]

0 3

4

Give one conclusion about the effect of caffeine on reactions

caffeine reduces reaction time/speeds up reactions/reduces catch distance [1 mark]

0 3

5

Suggest how the student could confirm the reproducibility of this investigation

compare results with another group [1]; look for similar patterns/results [1]

assuming other group used the same variables [1] [2 marks]