



Combined Science Biology Paper 1 Foundation Tier: Extended Open Response question

6dii (2024)

*(ii) Beriberi can affect reflexes.

Figure 10 shows a reflex arc.

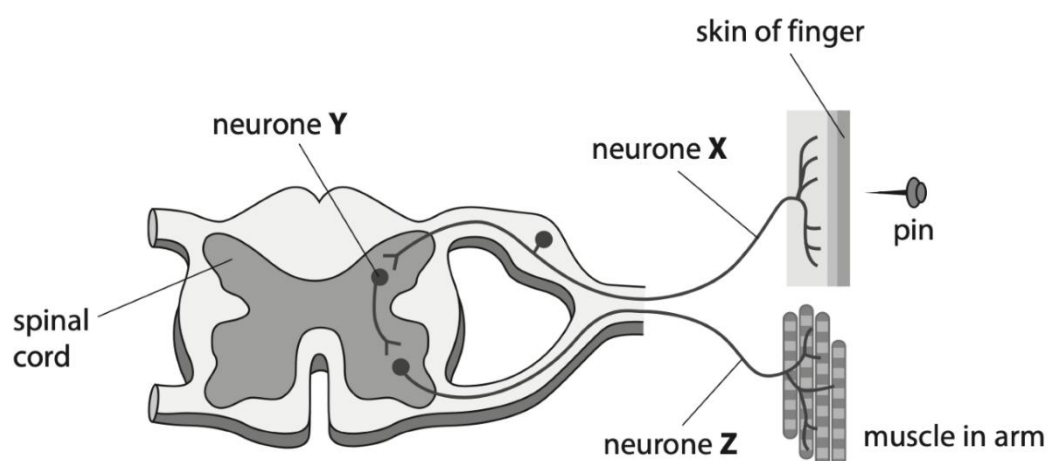


Figure 10

When the skin is pricked by a pin, electrical impulses travel through a reflex arc.

Describe the path taken by electrical impulses from the skin to the muscles in the arm.

Include the names of neurones X, Y and Z in your answer.

(6)



First the skin is pricked then the reflex arc sends an electrical signal ~~in the~~ covered in myelin sheath to speed up the transmission and to hinder any damage to the impulse. then it arrives at the synapse and a chemical is released to let the impulse jump across the junction and then the electrical impulse travels through the myelin sheath again ~~in the~~ until it reaches the muscles in the arm and the impulse tells the muscles ~~to~~ in the

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arm to move causing the finger to move away from the pin to get the finger away from the danger. this reflex arc also passes through the spinal cord



Question number	Indicative content	Mark
6(d)(ii)*	<p style="text-align: center;">AO2</p> <p>path</p> <ul style="list-style-type: none"> electrical impulses travel from the skin → <pre> neurone X → neurone Y → → neurone Z muscle in the arm </pre> <p>reflex arc detail</p> <ul style="list-style-type: none"> pricking the skin is a stimulus (the stimulus is) detected by receptors neurone Y / relay neurone is in the spinal cord / CNS there are synapses between neurones chemical transmitters are released at synapses the muscle is the effector the muscle contracts - this is the response electrical impulses do not travel to the brain the response is very fast <p>neurones</p> <ul style="list-style-type: none"> X - sensory neurone Y - relay neurone Z - motor neurone 	<p>(6)</p> <p>AO2 1</p>

Level	Mark	Descriptor
	0	<ul style="list-style-type: none"> No rewardable material.
Level 1	1-2	<ul style="list-style-type: none"> The description attempts to link and apply knowledge and understanding of scientific ideas, flawed or simplistic connections made between elements in the context of the question. Lines of reasoning are unsupported or unclear.
Level 2	3-4	<ul style="list-style-type: none"> The description is mostly supported through linkage and application of knowledge and understanding of scientific ideas, some logical connections made between elements in the context of the question. Lines of reasoning mostly supported through the application of relevant evidence.
Level 3	5-6	<ul style="list-style-type: none"> The description is supported throughout by linkage and application of knowledge and understanding of scientific ideas, logical connections made between elements in the context of the question. Lines of reasoning are supported by sustained application of relevant evidence.



Level	Mark	Additional Guidance	General additional guidance
Level 1	1-2	<ul style="list-style-type: none"> The answer refers to part of the path taken by electrical impulses The response includes an additional point of detail of the path 	<p>The level is determined by the quality of the description of the path taken by electrical impulses in a reflex arc</p> <p>The mark within the level is determined by additional detail of the path and reflex</p> <p><u>Possible candidate response</u></p> <ul style="list-style-type: none"> Impulses go from the skin through X Impulses from the skin through X to the spinal cord
Level 2	3-4	<ul style="list-style-type: none"> The description of the path includes X to Y to Z The response includes an additional point of detail of the path AND a named neurone 	<p><u>Possible candidate response</u></p> <ul style="list-style-type: none"> Impulses go through X to Y then to Z Impulses go from the skin, through the sensory neurone to Y, which is in the spinal cord. Impulses then go to Z and on to the muscle.
Level 3	5-6	<ul style="list-style-type: none"> The description of the path includes X to Y to Z and includes the names of at least two neurones OR one named neurone and reference to synapses The response includes an additional point of detail 	<p><u>Possible candidate responses</u></p> <ul style="list-style-type: none"> Impulses go through the sensory neurone, to Y then to Z, which is a motor neurone. Impulses go from the skin, through X, the sensory neurone. Y is a relay neurone, which is in the spinal cord. Impulses then go to Z which is a motor neurone.