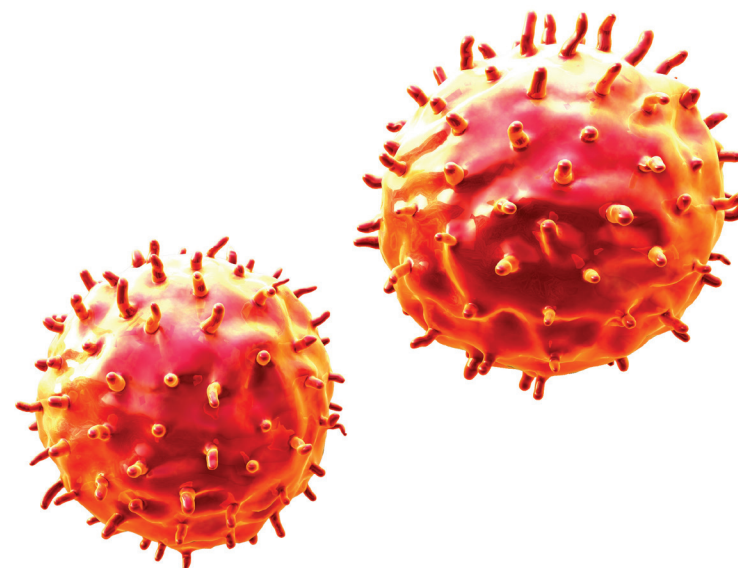


Interactive Example Candidate Responses

Paper 4 (May / June 2016), Question 2

Cambridge IGCSE™
Biology 0610



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2 The nervous system coordinates the responses of animals to changes in their environment.

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Complete Fig. 2.1 by writing the names of the missing parts of the mammalian nervous system in the boxes.

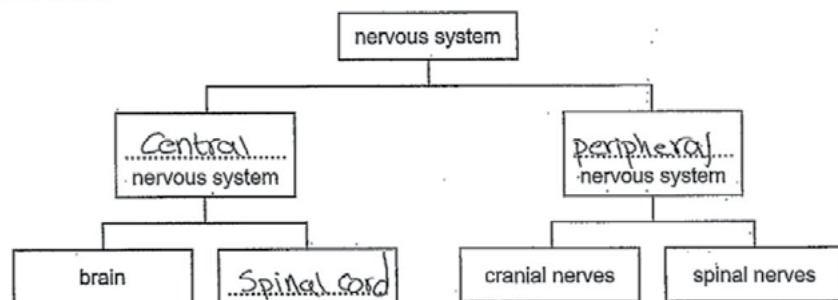


Fig. 2.1

[3]

(b) Fig. 2.2 is a flow chart that shows how an involuntary action is controlled.

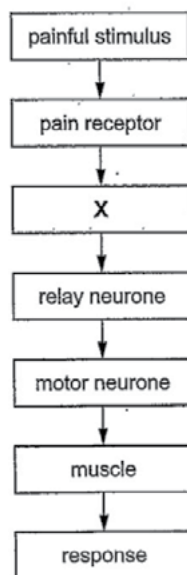


Fig. 2.2

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2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

2(c)(iv)

Q2	Mark scheme	
(a)	central (nervous system) ; peripheral (nervous system) ; spinal cord ; R spine	3 marks
(b)(i)	sensory neurone ; A afferent neurone R sensory nerve	1 mark
(b)(ii)	simple reflex / reflex ; A reflex arc	1 mark
(b)(iii)	slower / takes more time ; needs thought / uses (higher centres of) the brain / conscious control ; learnt / not inherited / not innate / needs training / AW ; not automatic ; response is not always the same to the stimulus ;	2 marks

(i) State the structure found at X.

..... Sensory neurone [1]

(ii) State the type of involuntary action shown by the flow chart.

..... reflex action [1]

(iii) State two ways in which a voluntary action differs from an involuntary action.

1. Voluntary action happens under conscious control involving the brain in its initiation.
2. Involuntary actions are faster than voluntary actions.

[2]

Your
Mark

2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

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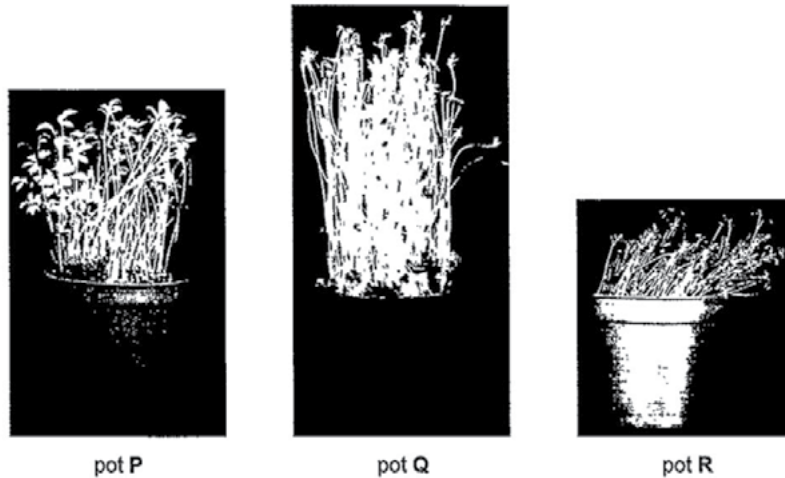


Fig. 2.3

(i) State the conditions in which pots P and Q were kept.

P plenty of light upwards
Q dark conditions

[1]

(ii) State the name of the growth response shown by the seedlings in pot R.

positive phototropism

[2]

Your
Mark

2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

2(c)(iv)

Q2	Mark scheme
(c)(i)	<p>either</p> <p>pot P – (uniform) light AND pot Q – no light / dark / covered (up) ;</p> <p>or</p> <p>pot P – (uniform) with / plus, magnesium AND pot Q – no magnesium ;</p> <p>A pot P has all nutrients 1 mark</p>
(c)(ii)	<p>positive ;</p> <p>(photo)tropism / (photo)tropic ;</p> <p>R (photo)trophic / geotropic / gravitropic 2 marks</p>
(c)(iii)	<p>idea that leaves / seedlings / plants / chloroplasts, get more light ;</p> <p>more (light) <u>energy</u>, absorbed / trapped / AW ;</p> <p>more photosynthesis ;</p> <p>more, growth / biomass / glucose / starch / AW ;</p> <p>'more' is only required once 2 marks</p>
(c)(iv)	<p>(auxins) made / produced, in (shoot), tip / apex ;</p> <p>I 'found, in / on'</p> <p>pass / move / diffuse / spread (down the stem) ;</p> <p>auxins collect in the side, in the dark / away from light ;</p> <p>A 'dark / shaded, side'</p> <p>greater (cell) elongation on side in the dark ;</p> <p>AVP ; e.g. absorption of water (by osmosis) / stretching of cell walls /</p> <p>phototropin(s) / plants detect or sense light / ref to turgor pressure</p> <p>I comments about roots 4 marks</p>

(iii) Explain the advantage to the seedlings of this growth response.

~~the~~ Positive phototropism helps the shoots to move and grow to the direction of light. This helps the cells to be ~~more~~ exposed to more ~~light~~ light which is trapped by chlorophyll in chloroplast, which is essential for photosynthesis. This leads to higher rate of photosynthesis ~~and~~ and thus more growth. [2]

(iv) Auxins control the growth responses of seedlings. due to the formation of more glucose.

Explain how auxins control the growth response of the seedlings in pot R.

~~* As light falls on one side~~
* One side of the shoot is exposed to light.
* Auxin from the tip diffuse more ~~to~~ to the shaded side than the one exposed to light.
* They accumulate on the shaded side causing the cells to absorb more water than the other side and become more ~~and~~ elongated.
* The uneven growth causes the shoot to bend towards the direction of the light. [4]

[Total: 16]

Your
Mark

2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

2(c)(iv)

Q2	Mark scheme
(c)(i)	either pot P – (uniform) light AND pot Q – no light / dark / covered (up) ; or pot P – (uniform) with / plus, magnesium AND pot Q – no magnesium ; A pot P has all nutrients 1 mark
(c)(ii)	positive ; (photo)tropism / (photo)tropic ; R (photo)trophic / geotropic / gravitropic 2 marks
(c)(iii)	idea that leaves / seedlings / plants / chloroplasts, get more light ; more (light) <u>energy</u> , absorbed / trapped / AW ; more photosynthesis ; more, growth / biomass / glucose / starch / AW ; 'more' is only required once 2 marks
(c)(iv)	(auxins) made / produced, in (shoot), tip / apex ; I 'found, in / on' pass / move / diffuse / spread (down the stem) ; auxins collect in the side, in the dark / away from light ; A 'dark / shaded, side' greater (cell) elongation on side in the dark ; AVP ; e.g. absorption of water (by osmosis) / stretching of cell walls / phototropin(s) / plants detect or sense light / ref to turgor pressure I comments about roots 4 marks

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(a) Fig. 2.1 shows the arrangement of the nervous system in a mammal.

Complete Fig. 2.1 by writing the names of the missing parts of the mammalian nervous system in the boxes.

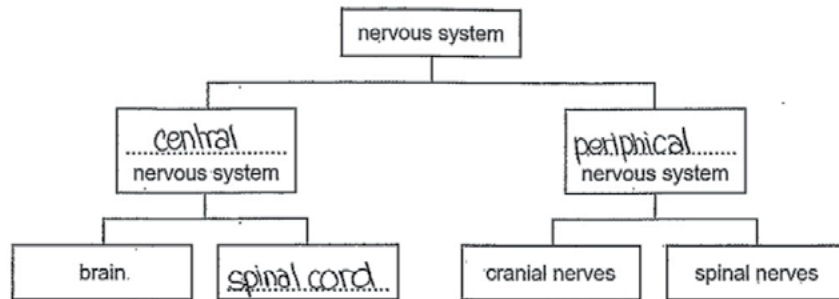


Fig. 2.1

[3]

(b) Fig. 2.2 is a flow chart that shows how an involuntary action is controlled.

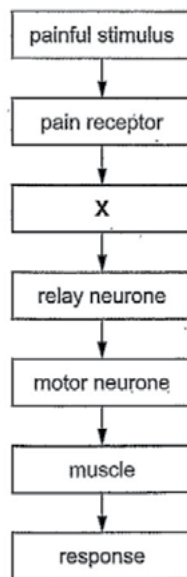


Fig. 2.2

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2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

2(c)(iv)

Q2	Mark scheme	
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(i) State the structure found at X.

coordinator [1]

(ii) State the type of involuntary action shown by the flow chart.

reflex arc [1]

(iii) State **two** ways in which a voluntary action differs from an involuntary action.

1 It can be controlled - you can choose to do it
which you can't in involuntary action
2 You think about voluntary actions but you don't
think about involuntary action, it just happens [2]

Your
Mark

2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

2(c)(iv)

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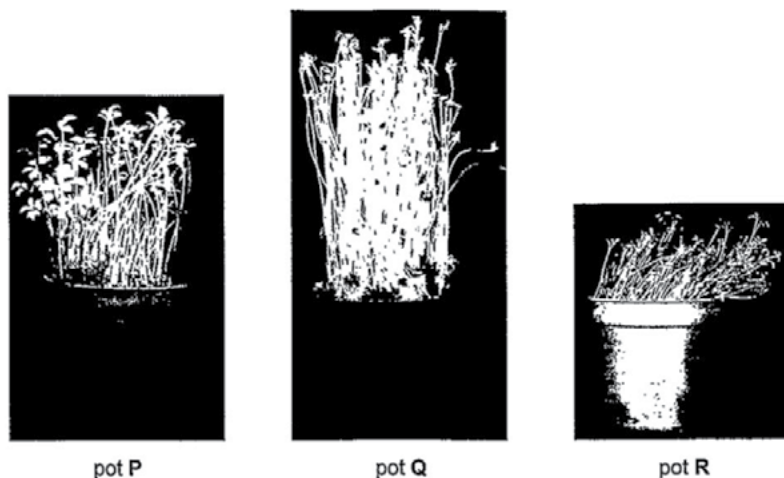


Fig. 2.3

(i) State the conditions in which pots P and Q were kept.

P Dark
Q Light

[1]

(ii) State the name of the growth response shown by the seedlings in pot R.

phototropism

[2]

Select
page

Your
Mark

2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

2(c)(iv)

Q2	Mark scheme
(c)(i)	<p><i>either</i> pot P – (uniform) light AND pot Q – no light / dark / covered (up) ; <i>or</i> pot P – (uniform) with / plus, magnesium AND pot Q – no magnesium ; A pot P has all nutrients 1 mark</p>
(c)(ii)	<p>positive ; (photo)tropism / (photo)tropic ; R (photo)trophic / geotropic / gravitropic 2 marks</p>
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(c)(iv)	<p>(auxins) made / produced, in (shoot), tip / apex ; I 'found, in / on' pass / move / diffuse / spread (down the stem) ; auxins collect in the side, in the dark / away from light ; A 'dark / shaded, side' greater (cell) elongation on side in the dark ; AVP ; e.g. absorption of water (by osmosis) / stretching of cell walls / phototropin(s) / plants detect or sense light / ref to turgor pressure I comments about roots 4 marks</p>

(iii) Explain the advantage to the seedlings of this growth response.

It grows towards the light so the whole plant has an access to light and grow better. It's also good for the plant because it gets all the nutrients needed from the sun.

[2]

(iv) Auxins control the growth responses of seedlings.

Explain how auxins control the growth response of the seedlings in pot R.

As you can see, the seedling in pot R are slightly bend towards the right side. This means that the light is coming from the right. This also means that the right side of the seedlings does receive light but the left side does not. That's why a plant hormone, auxin, collects on the side of the seedling that is reached by light and weights it down so the left side seedling bends under it's weight (to the right) and the left side elongate and is now exposed to the light. [4]

[Total: 16]

Your
Mark

2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

2(c)(iv)

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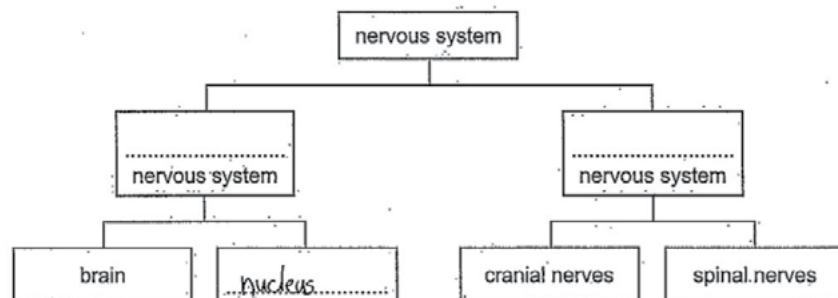


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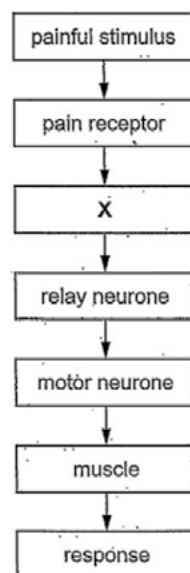


Fig. 2.2

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2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

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(i) State the structure found at X.

~~Spinal cord~~ Spinal cord [1]

(ii) State the type of involuntary action shown by the flow chart.

~~Uncontrolled reaction~~ Uncontrolled reaction [1]

(iii) State two ways in which a voluntary action differs from an involuntary action.

1. It comes from the spinal cord not from the brain for faster reaction.
2. You do not control the reaction.

[2]

Your
Mark

2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

2(c)(iv)

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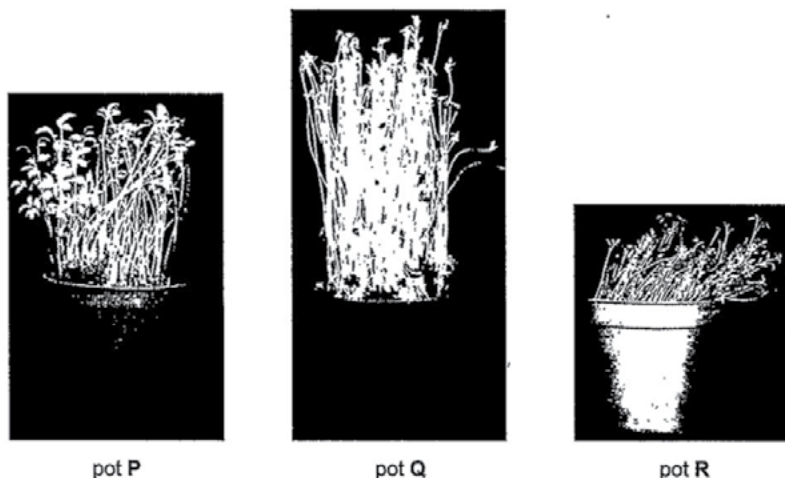


Fig. 2.3

(i) State the conditions in which pots P and Q were kept.

P.....Sunlight.....
Q.....Dimlight and too much water.....

[1]

(ii) State the name of the growth response shown by the seedlings in pot R.

It's cells were not exposed to light from same place.....

[2]

Select
page

Your
Mark

2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

2(c)(ii)

2(c)(iii)

2(c)(iv)

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(iii) Explain the advantage to the seedlings of this growth response.

The ^{Plant} ~~sun~~ was exposed to the sun from only one side so it grew ~~toward~~ towards the sun. And it grew longer roots and it is easier for spreading pollen grains for reproduction of ~~animals~~ of other plants and even other plant species. [2]

(iv) Auxins control the growth responses of seedlings.

Explain how auxins control the growth response of the seedlings in pot R.

Pot one was partially exposed to the sun and barely watered so the ~~ex~~ auxin hormone ~~hypothetically~~ ~~formed~~ ~~in the~~ ~~plant~~ ~~which~~ supported the plant in growing leaves and helped it maintain its root. [4]

[Total: 16]

Your
Mark

2(a)

2(b)(i)

2(b)(ii)

2(b)(iii)

2(c)(i)

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2(c)(iii)

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