PEARSON EDEXCEL A-LEVEL BIOLOGY B · 9BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 9: CONTROL SYSTEMS

CHEMICAL CONTROL IN MAMMALS

SCORE	PERCENTAGE
/39	%

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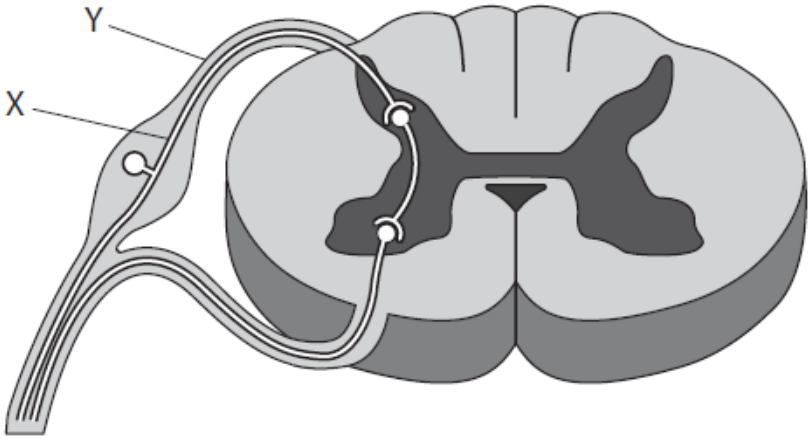
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Q1.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

(i) The diagram shows a section through the spinal cord.



Which row correctly names the structures labelled X and Y?

(1)

	X	Y
☐ **A**	motor neurone	dorsal root
☐ **B**	motor neurone	ventral root
☐ **C**	sensory neurone	dorsal root
☐ **D**	sensory neurone	ventral root

(ii) Which region of the brain only controls breathing and heart rate?

(1)

☒ **A** cerebellum

☒ **B** cerebrum

☒ **C** hypothalamus

☒ **D** medulla oblongata

(Total for question = 2 marks)

Q2.

The hormone adrenaline is unable to pass through cell membranes.

When liver and muscle cells are exposed to adrenaline, the enzyme glycogen phosphorylase breaks down glycogen in these cells.

Describe how adrenaline causes liver cells to increase the concentration of glucose in the blood.

(3)

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(Total for question = 3 marks)

Q3.

Explain how the resting potential is maintained in a neurone.

(4)

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(Total for question = 4 marks)

Q4. The scientific article you have studied is adapted from several sources.

Use the information from the article and your own knowledge to answer the following questions.

(a) The sweet potato eaten by naked mole rats (paragraph 3) is very rich in starch. Starch can be a combination of amylose and amylopectin.

Give **two** structural differences between amylose and amylopectin.

(2)

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(b) Explain why a colony of naked mole rats is considered 'a eusocial society' (paragraph 4).

(2)

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(c) Naked mole rats show evidence of poikilothermy (paragraph 5).

(i) Explain what is meant by the term **poikilothermic**.

(1)

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(ii) Suggest how each of the following 'contribute to poikilothermic responses to changing temperature of this mammal'.

(2)

'Lack of an insulating layer'

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'A marked reduction in sweat glands'

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(d) Suggest a mechanism that could have been used to genetically modify cells from mice with cancer-causing genes (paragraph 13).

(2)

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*(e) Whilst naked mole rats are 'impervious to chemical pain' they do feel 'acute pain such as cuts and burns' (paragraph 31).

Touching something hot, which could lead to a burn, can cause nerve impulses to travel along myelinated sensory neurones very rapidly.

Explain how myelination increases the speed of transmission of nerve impulses in a sensory neurone.

(5)

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(f) Explain how a heart attack can temporarily reduce the oxygen concentration in brain tissue (paragraph 36).

(3)

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(g) Using the information in paragraph 48, name **one** hormone **and** state its function.

(1)

Hormone:

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Function:

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(h) Suggest how a change in the mid region of the sperm may make it non-motile (paragraph 48).

(2)

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(i) Disperser naked mole rats 'are laden with fat' (paragraph 50).

Suggest why it may be advantageous for disperser naked mole rats to have high levels of fat.

(3)

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(j) Explain the statement that 'a preference by reproductively active females for unfamiliar males is interpreted as inbreeding avoidance' (paragraph 52).

(2)

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(k) 'The naked mole rat hasn't yet had its genome sequenced' (paragraph 53).

Explain what is meant by the term **genome sequenced**.

(1)

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(l) 'With so much to offer science, it is no surprise that naked mole rats are becoming more common in labs' (paragraph 53).

Using information from the article, describe **two** adaptations of naked mole rats. For each adaptation, explain why it could be of interest in a medical research laboratory.

(4)

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(Total for Question = 30 marks)