

Unit 3 Biology

Revision Booklet 5

Topics

The Nervous System

Name:

Question 6 (2012)

Homeostasis is essential for the survival of any organism.

a. i. What is homeostasis?

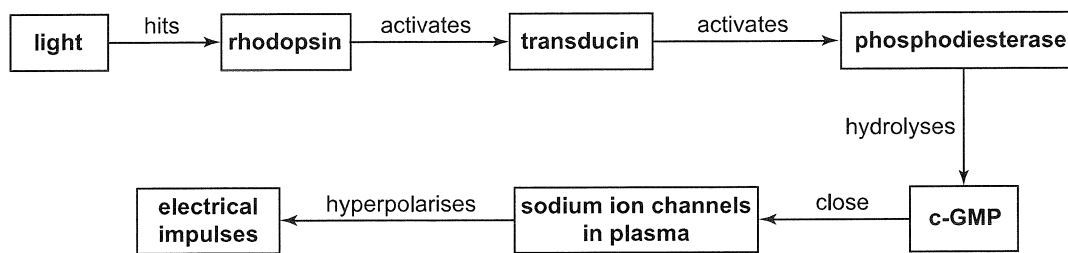
ii. State one variable, other than body temperature and blood calcium levels, that is under homeostatic control in a mammal. Explain why the homeostatic control of this variable is essential for survival.

Variable _____

Explanation _____

1 + 2 = 3 marks

The flow chart below summarises a sequence of events occurring inside a rod cell in the retina of the human eye.



This sequence of events is part of a stimulus-response system.

b. i. Explain why a rod cell is regarded as a receptor in this system.

ii. Many of a human's regulating systems are based on negative feedback.

Does the series of events taking place in a rod cell form part of a negative feedback system? Explain your answer.

A rod cell is part of the nervous system. The nervous system and the endocrine system work together to maintain homeostasis.

c. A comparison between one aspect of the nervous system and the endocrine system is given in the table below. Complete the table with reference to two other aspects of the nervous and endocrine systems.

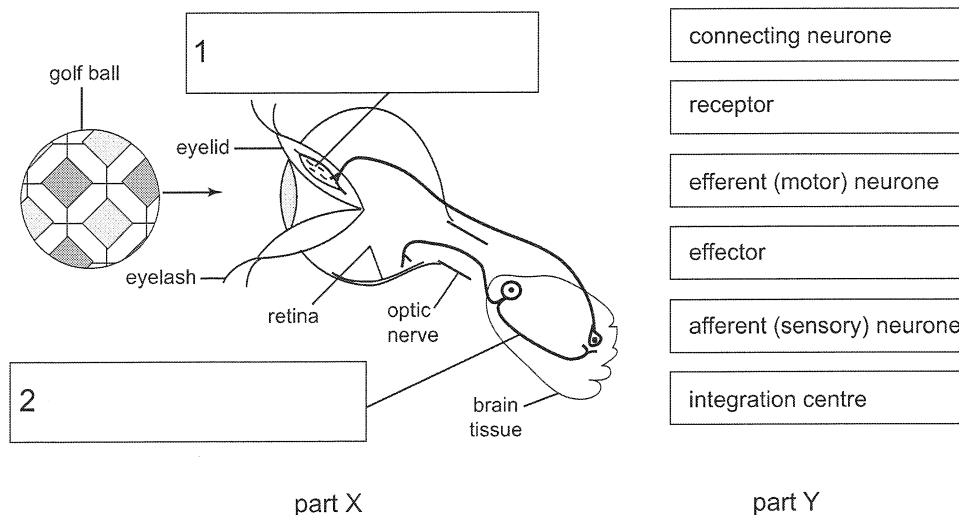
Differences	Aspect	Nervous system	Endocrine system
1	Type of message	Electrical	Chemical
2			
3			

Question 6 2009

The diagram below has two parts.

Part X – shows a high-speed golf ball approaching an eye and part of the pathway of an automatic blinking response.

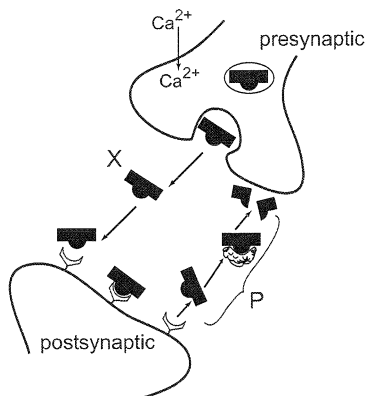
Part Y – comprises six boxes, each containing the name of a general component of an automatic regulatory system that operates in the human body.



- a. Select the two most appropriate words from the list given in part Y and complete the labels 1 and 2 in the spaces provided on the diagram.

2 marks

The following diagram shows a synapse between the end of one neurone and the dendrite of another.



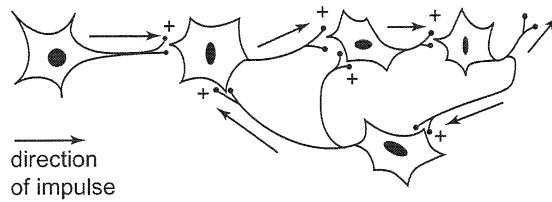
- b. What is the general name for molecule X?

1 mark

c. Describe what occurs at stage P.

1 mark

The following diagram shows the arrangement of a network of five neurones that form part of a pathway. The + signs indicate that these are excitatory synapses.



Circuits such as this are part of the system for the nervous control of rhythmic breathing.

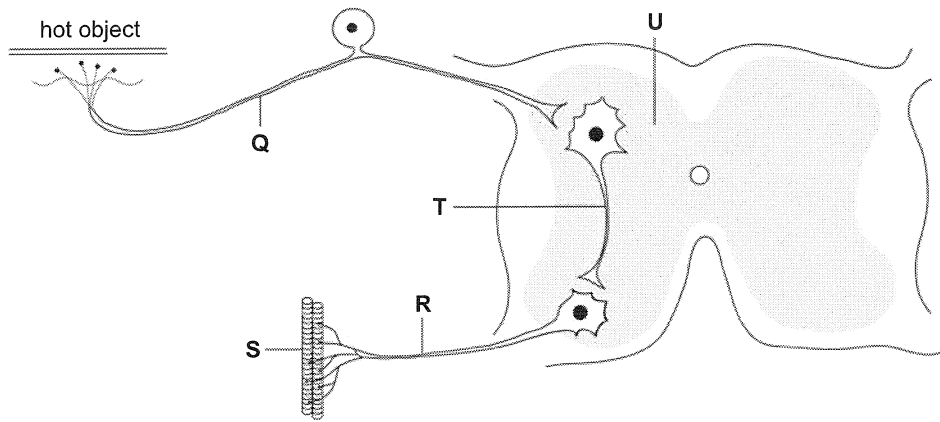
d. i. Explain how the circuit works.

ii. Why are such networks important to rhythmic breathing?

1 + 1 = 2 marks

Total 6 marks

The following diagram shows a nerve pathway that is activated when a person touches a very hot object.



- c. Which part of the diagram represents an interneuron?

1 mark

- d. What is the general name given to the type of nerve pathway shown in the diagram?

1 mark

The myelin sheath along structure Q can be damaged by disease.

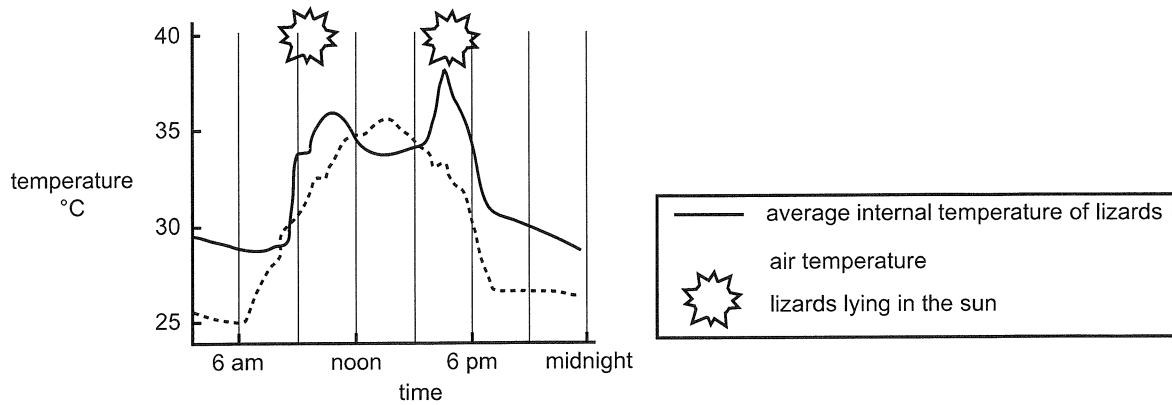
- e. Describe how such damage would affect the person involved.

1 mark

Total 6 marks

Question 9 ~~2007~~

Researchers measured the internal body temperatures of a number of perentie lizards, *Varanus giganteus*, on a day in March 1983. The following graph shows the average body and air temperature for that day.



- a. i. On this day, at what time did the lizards reach their highest internal body temperature?
-
- ii. Does the answer you gave in **part i.** coincide with the highest air temperature for the day? Explain.
-
-

1 + 1 = 2 marks

- b. Is a lizard likely to detect skin temperature by the nervous system or the hormonal system? Explain.
-
-

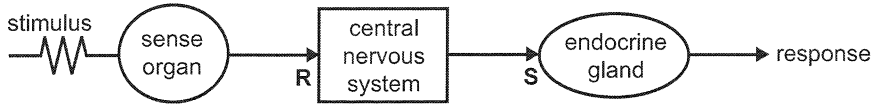
1 mark

Total 3 marks

Question 6 2006

A number of different kinds of signals are responsible for the coordination and regulation of systems in humans.

Consider the following model of one of these systems.



Two different kinds of signalling molecules operate at points R and S in this system.

- a. For each point, name the kind of signalling molecule that would act and the kind of cell that produced the signalling molecule. Write your answer in the following table.

point R	Signalling molecule	
	Type of cell producing the molecule	
point S	Signalling molecule	
	Type of cell producing the molecule	

4 marks

In many nervous control systems, a large network of cells is involved. Some of the signals delivered by these cells may inhibit further action while some promote an action.

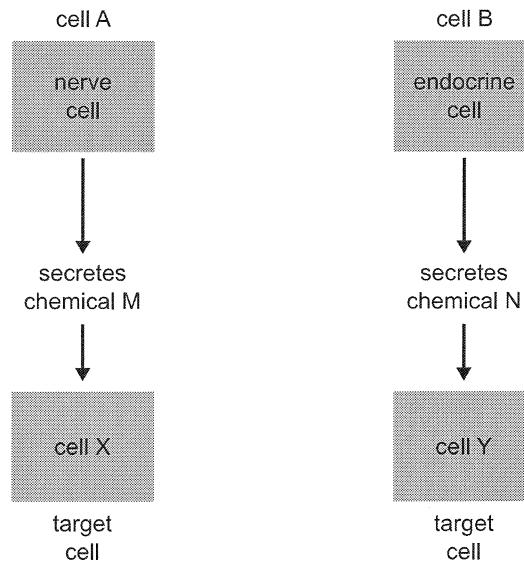
- b. Explain why such an arrangement is beneficial to a control system.

2 marks

Total 6 marks

Question 6 2005

Cell A and cell B represent two types of cells found in complex multicellular animals. Cell A is a nerve cell (neurone). Cell B is an endocrine cell. The diagram below shows how cells A and B interact with other types of cells, cell X and cell Y, in the body.



a. Describe the means by which chemical M reaches cell X.

1 mark

b. Describe the means by which chemical N reaches cell Y.

1 mark

c. i. Which system has the quicker response: the nervous system or the endocrine system?

ii. Describe one characteristic of the system you chose in part c. i. that is significant in making the difference in response time.

1 + 1 = 2 marks