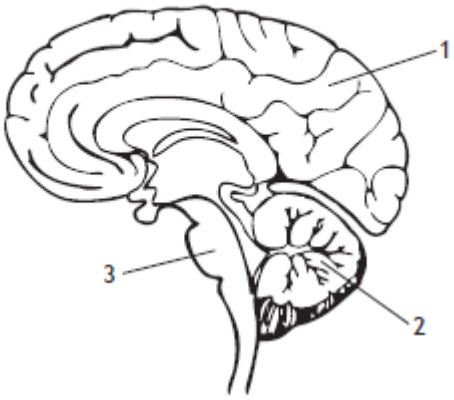
Unit 2 Multicellular Organisms

Key Area 2 Control and Communication

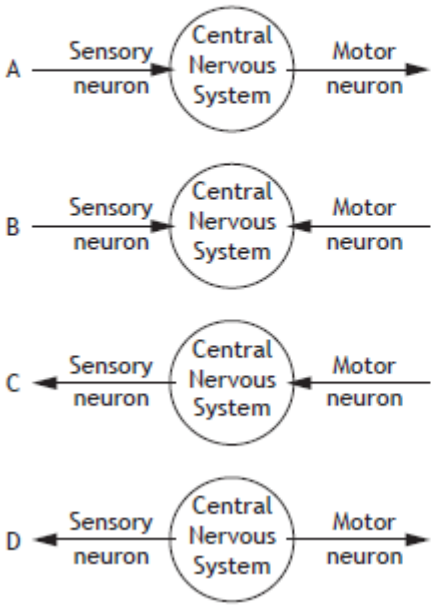
1. The diagram below represents the human brain.



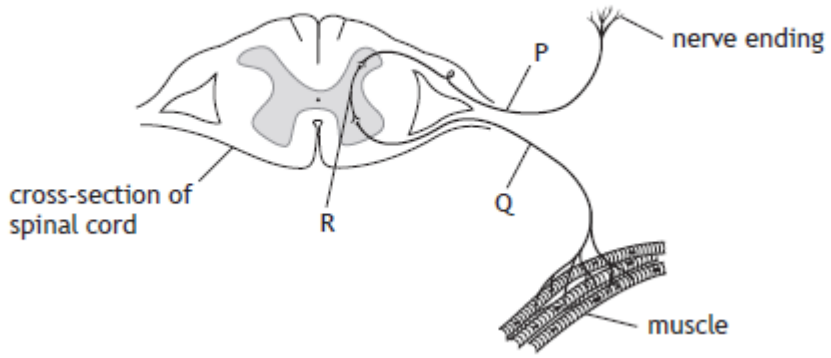
Which line in the table below identifies structures 1, 2 and 3 of the human brain?

	Structure 1	*Structure 2*	*Structure 3*
A	medulla	cerebrum	cerebellum
B	cerebrum	medulla	cerebellum
C	cerebellum	cerebrum	medulla
D	cerebrum	cerebellum	medulla

2. Which of the diagrams below identifies neurons and the direction of travel of nerve impulses?



3. The diagram shows some of the structures found in a reflex arc.



Which row in the table identifies P, Q and R?

	Motor neuron	*Sensory neuron*	*Inter neuron*
A	Q	R	P
B	Q	P	R
C	R	P	Q
D	P	R	Q

4. The diagram represents a section through the brain.

Which of the following links a letter to its correct structure and function?

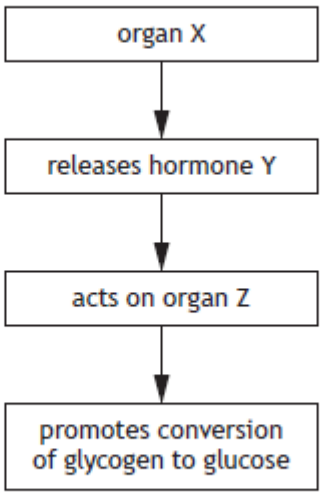
A G is the cerebrum and is the site of reasoning and memory.

B G is the cerebellum and is the site of reasoning and memory.

C H is the medulla and controls muscle coordination.

D H is the cerebellum and controls breathing and heart rate.

Questions 5 and 6 refer to the following flow diagram which represents blood glucose regulation.



5. Which row in the table identifies organ X and hormone Y?

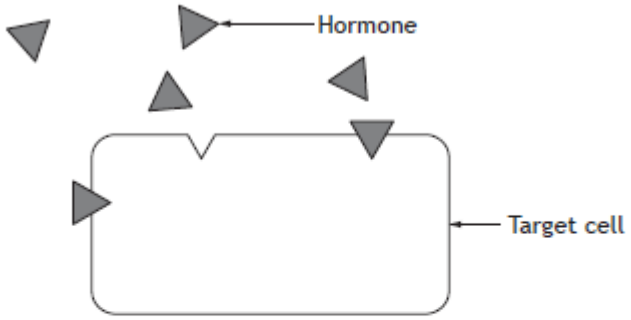
	Organ X	*Hormone Y*
A	Liver	Insulin
B	Liver	Glucagon
C	Pancreas	Insulin
D	Pancreas	Glucagon

6. Specialised cells allow organ Z to respond to hormone Y.
This is because the surface of the cells in organ Z have complementary

A synapses
B neurons
C effectors
D receptors.

7.

(a) The diagram shows a hormone, such as insulin, binding with its target cell.



(i) Explain why a hormone only works on its target cell. 1

(ii) Hormone messages travel slower than nerve messages.
State one other difference between these messages. 1

(b) Diabetes is a condition in which the blood glucose level is not fully controlled by insulin. There are two types of diabetes. The table shows information about both types.

Type 1 diabetes	*Type 2 diabetes*
Insulin is not produced	Insulin is produced but is not used effectively
Usually starts at a young age	Often associated with being obese
Can be triggered by infection	Can be controlled with diet and exercise
Daily insulin injections	Medication can be given in tablet form

(b) (continued)

A person with diabetes was treated with daily insulin injections.

(i) Using information from the table, state which type of diabetes this person had and why this treatment was required. 1

_____

_____

(ii) Describe what would happen to this person's blood glucose level if they had not been treated. 1

_____

_____

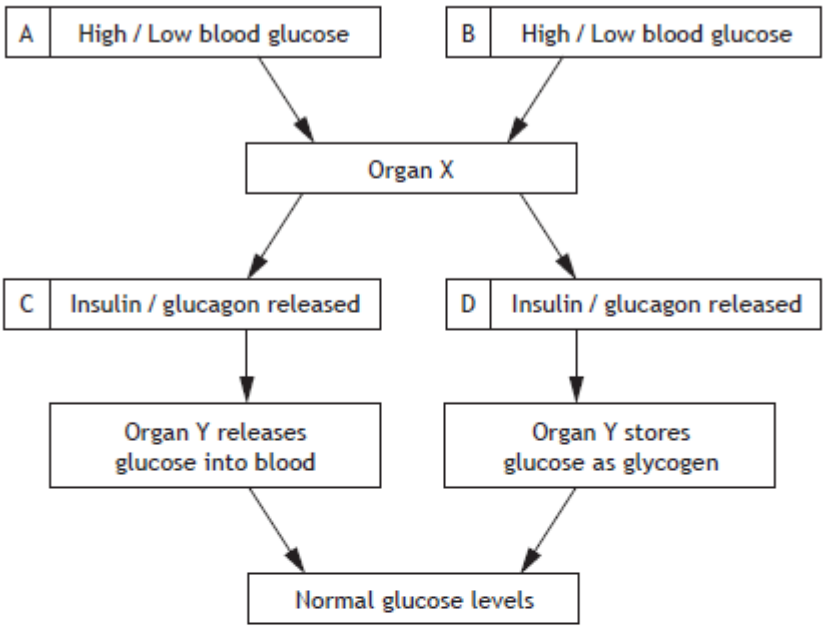
(iii) Name the organ which is not functioning properly, causing type 1 diabetes. 1

_____

Total marks 5

8.

(a) The regulation of glucose in the blood is represented in the diagram below.



(i) The diagram above has two options in each of the four boxes A, B, C, D.

Circle the correct option in each box. 2

(ii) Identify organs X and Y. 2

Organ X _____

Organ Y _____

(b) Insulin and glucagon are hormones.

Describe two features of hormones. 2

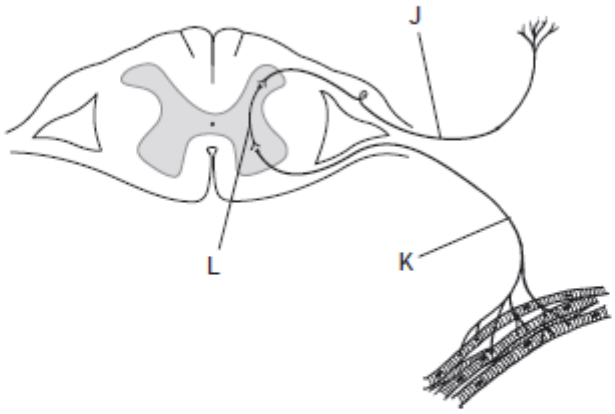
1 _____

2 _____

Total marks 6

9.

The diagram below shows the neurons involved in a reflex action. Neurons J, K and L form a reflex arc.



(a) Describe how information is passed along a neuron. 1

_____

(b) Select one of the neurons shown in the diagram and tick (✓) the appropriate box below.

Name that type of neuron and describe its particular function. 2

J ☐ K ☐ L ☐

Name _____

Function _____

_____

_____

(c) During a reflex action, the speed at which the information flows was measured to be 90 metres per second.

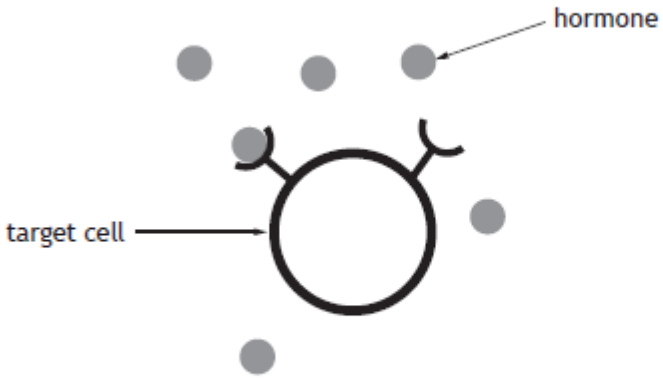
Calculate how long it would take for the information to complete a reflex arc which was 0·9 m in length. 1

Space for calculation

_____ seconds

10.

(a) The diagram below represents a hormone binding to a cell within its target tissue.



Explain why only the target cells are affected by this hormone. 1

(b) Name the type of gland that releases hormones into the bloodstream. 1

(c) Blood glucose levels are controlled by two hormones.

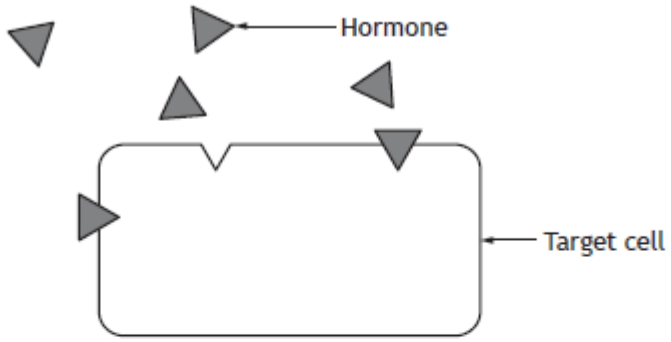
Underline one option in the bracket to make the following sentence correct. 1

A decrease in blood glucose levels is detected by the pancreas

and this causes an increase in the release of { glycogen / insulin / glucagon }

into the blood stream.

11. (a) The diagram shows a hormone, such as insulin, binding with its target cell.



(i) Explain why a hormone only works on its target cell. 1

(ii) Hormone messages travel more slowly than nerve messages.
State one other difference between these messages. 1

(b) Diabetes is a condition in which the blood glucose level is not fully controlled by insulin. There are two types of diabetes. The table shows information about both types.

Type 1 diabetes	*Type 2 diabetes*
Insulin is not produced	Insulin is produced but is not used effectively
Often starts at a young age	Often associated with being obese
Can be triggered by infection	Can be controlled with diet and exercise
Treated with daily insulin injections	Medication can be given in tablet form

A person with diabetes was treated with daily insulin injections.

(i) Using information from the table, state which type of diabetes this person had and why this treatment was required. 1

(ii) Describe what would happen to this person's blood glucose level if they had not been treated. 1

(iii) Name the organ which, if not functioning properly, results in type 1 diabetes. 1

12. After a head injury, a student became dizzy and occasionally lost balance.

(a) Name the part of the brain which controls balance. 1

_____

(b) To test if there was also damage to the spinal cord, doctors touched different areas of the student's skin with a blunt needle.

Describe how the stimulus is detected at the skin and how the message is then carried into and across the spinal cord. 4

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