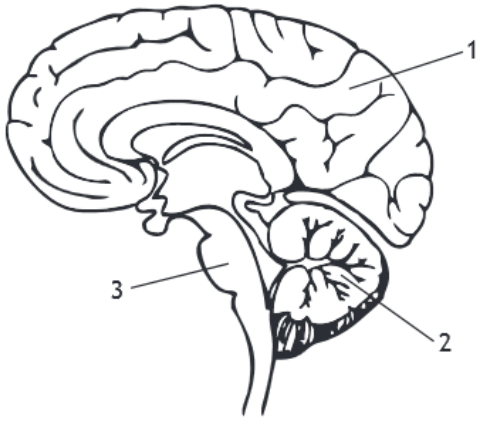
Control and Communication

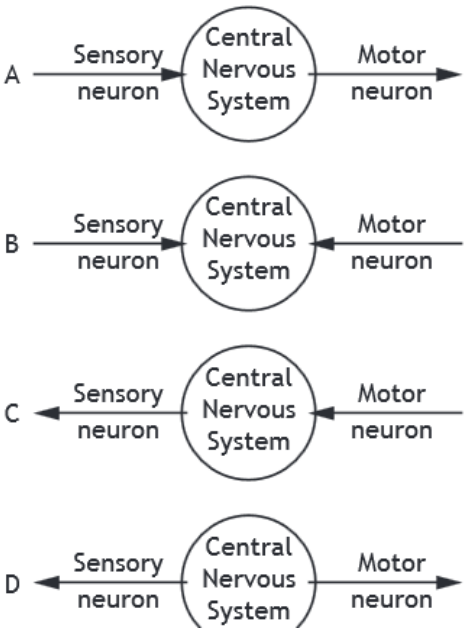
5. The diagram below represents the human brain.



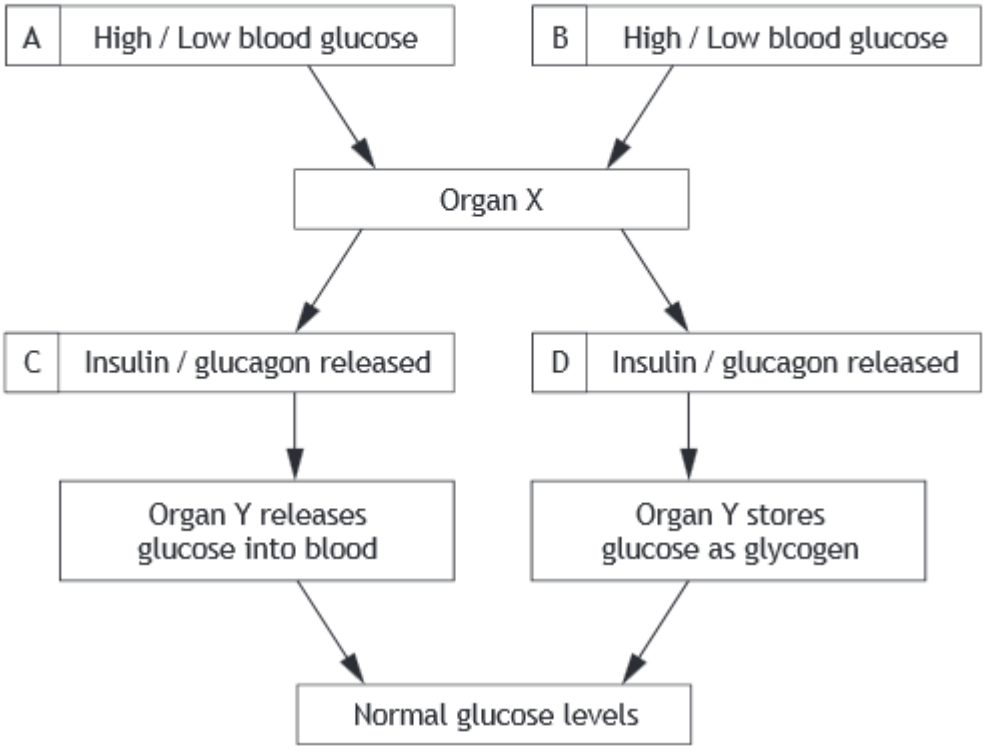
Which line in the table below identifies structures 1, 2 and 3 of the human brain?

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

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



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 _____

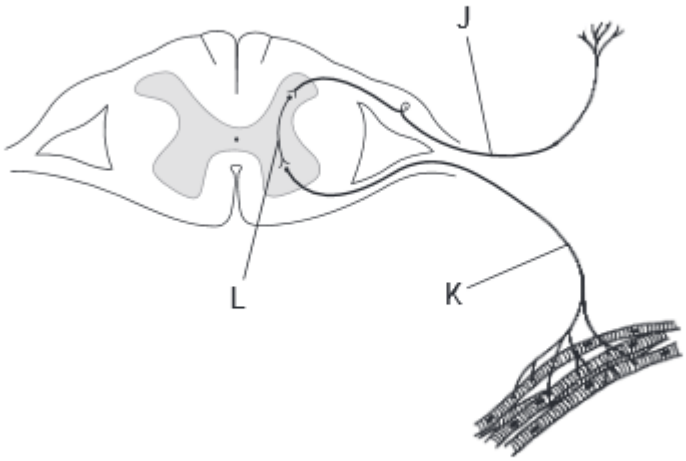
(b) Insulin and glucagon are hormones.

Describe two features of hormones. **2**

1 _____

2 _____

6. 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 _____

_____

_____

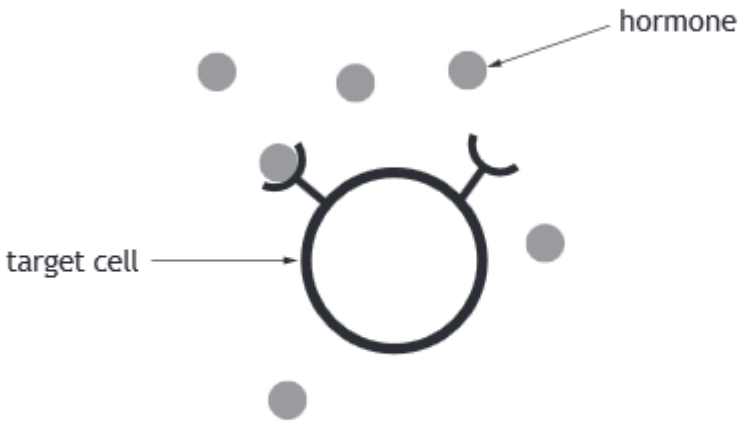
(c) During a reflex action, the speed at which the information flows was measured to be 90 metres per second.

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

5. Hormones are composed of

A glycerol
B glucose
C protein
D starch.

9. (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.

9. 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**

_____

10. Type 1 diabetes occurs if the body does not produce any or enough insulin.

(a) (i) Name the organ which produces insulin. **1**

_____

(ii) As a result of Type 1 diabetes, glucose is unable to enter the cells of the body. A symptom of this is extreme tiredness.

Using your knowledge of respiration, explain why a person suffering from diabetes might show extreme tiredness. **1**

_____

_____

_____

(b) People with Type 1 diabetes need to inject insulin.

The table contains information about some of the different types of insulin available.

Type of insulin	*Time for insulin to start working*	*Time for insulin levels to peak*	*Duration in blood* (hours)
P	1 hour	No peak	20–26
Q	1–3 hours	8 hours	12–16
R	30–60 minutes	2–4 hours	5–8
S	15 minutes	30–90 minutes	3–5

Using information from the table, answer the following questions.

(i) A fast acting type of insulin can be injected just before meals.

Identify the type of insulin that is best suited for this. **1**

_____

(ii) Another type of insulin can be injected once a day to provide a steady supply of insulin to the body.

Identify the type of insulin that would be most effective at doing this. **1**

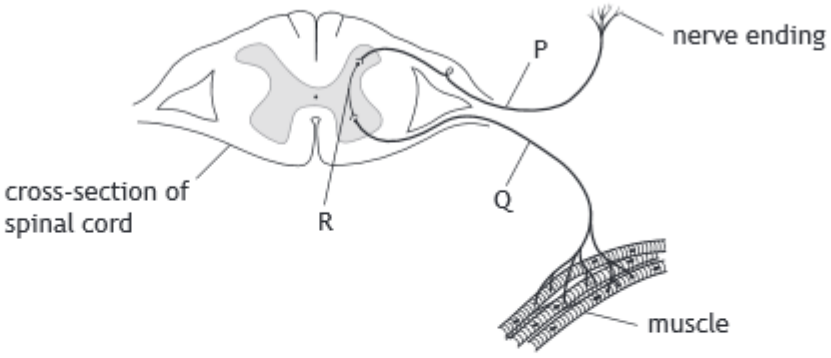
_____

(c) Diabetes also occurs if the target tissues in the body do not respond to insulin reaching them through the bloodstream.

Name the structures found on the surface of the target tissues that respond to the hormone insulin. **1**

_____

9. 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

10. The diagram represents a section through the brain.

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

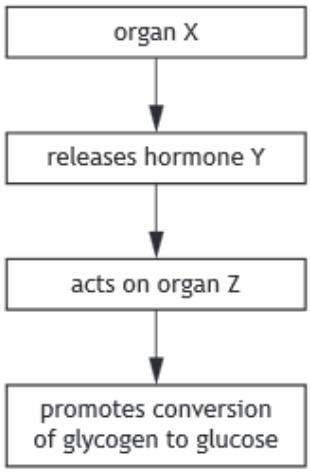
A G is the cerebrum and is the site of reasoning and memory.

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 11 and 12 refer to the following flow diagram related to blood glucose regulation.



11. 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

12. 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.