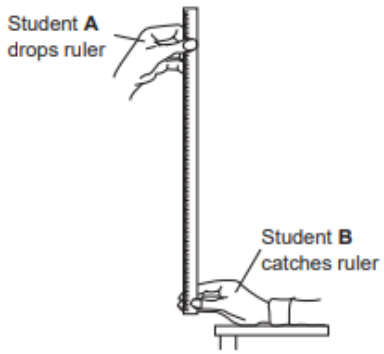
Q1. (2018)

18 A class of students investigate reaction time.

Student **A** drops a ruler while student **B** catches it.

They then measure the position of student **B**'s thumb on the ruler, this is the drop distance.

The diagram shows how the measurements were taken.



The drop distance is converted into a reaction time. The reaction time in seconds for each hand is recorded.

The table shows the results for ten **right-handed** students in the class.

Reaction time(s)	
Left non-dominant hand	**Right dominant hand**
0.22	0.28
0.23	0.25
0.27	0.23
0.24	0.24
0.25	0.24
0.25	0.25
0.25	0.26
0.25	0.26
0.25	0.26
0.27	0.23
Mean = 0.25	Mean = 0.25

A)

(a) (i) Calculate the **mode** for the right dominant hand.

Answer = ... seconds **[1]**

B)

(ii) The mean and mode for the left non-dominant hand are identical.

What **other** conclusions can be made about reaction times in these ten students?

.....

.....

..... **[2]**

C)

(b) How could these students improve the recording of their results?

.....

.....

..... **[2]**

D)

(c) The students want to investigate reaction times to see if left-handed people are faster than right-handed people.

How could they develop the experiment to test this?

.....

.....

.....

.....

..... **[3]**

E)

(d) The reaction in the experiment involves a **stimulus**.

What is the stimulus in the reaction involving catching the ruler?

..... **[1]**

F)

(e) Complete the sequence of a reflex arc.

Stimulus→	.....	Sensory neurone→	CNS→	....	Effector→	Response

[2]

Q2 (2018)

22 A girl walks from a sunny beach into a dark café.

Diagram **A** shows the girl's left eye on the beach.



A



B

(a) Diagram **B** shows the girl's left eye after she enters the café.

Explain how you can tell this and how this change happens.

.....

.....

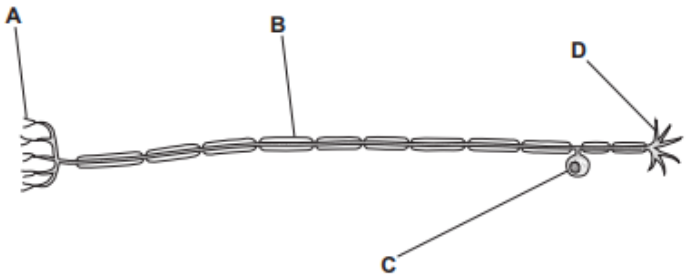
.....

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..... **[3]**

Q3 (2019)

5 Which label is pointing to the myelin sheath in a motor neurone?



Your answer ☐ **[1]**

Q4. (2019)

6 What is the name of the gap between two neurones?

A Axon

B Dendrite

C Lumen

D Synapse

Your answer ☐ **[1]**

Q5. (2019)

A)

18 **(a)** A scientist clones a cauliflower plant.



He uses small pieces of the cauliflower plant called explants.

This is the method the scientist uses to get the explants:

- Place the equipment in a beaker of bleach and swab the bench with 70% alcohol.
- Collect a small piece of cauliflower and place on a white tile.
- Use a scalpel to cut the piece of cauliflower lengthways into small 3–5 mm pieces called explants.
- Measure the mass of the explants.

(i) Suggest why the scientist uses a scalpel rather than a kitchen knife.

.....

..... **[1]**

B)

(ii) Write down **one** safety precaution that the scientist should take when using a scalpel.

.....

..... **[1]**

C)

(iii) The explants are then prepared for cloning by placing on an agar jelly plate.

Agar jelly contains water, sugars and minerals.



Agar jelly plate

When the explants are placed on the agar jelly plate they have no roots or leaves.

Explain why the explants must be placed on the agar jelly plate.

.....

.....

.....

.....

.....

.....

..... **[2]**

D)

(b) To grow the explants, the scientist places the agar jelly plate in a warm room near to a window.

(i) Explain why this will help the explants grow and develop into clones.

.....

.....

..... **[2]**

E)

(ii) Using a heated cabinet with light bulbs inside the cabinet would improve this method.

Explain why.

.....

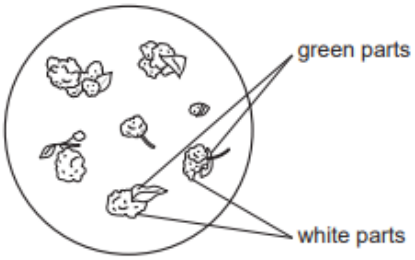
.....

..... **[2]**

F)

(iii) The scientist examines the agar jelly plate regularly.

Growth of the explants is visible in the plate within 10 days and parts of the explants are turning green.



What conclusion can be made about why the explants have parts that are turning green?

.....

..... **[1]**

G)

(c) The mass of the explants at the start was 15 g.

After 10 days the mass of the explants was 28 g.

Calculate the percentage increase in mass of the explants.

Give your answer to **1** decimal place.

Percentage increase = ... % **[3]**

Q6. (2020)

15 Anaesthetics used during operations slow down breathing and heart rate.

Which part of the brain do anaesthetics act on to do this?

A Cerebrum

B Cerebellum

C Medulla

D Pituitary

Your answer ☐ **[1]**

Q7 (2020)

A)

20 **Fig. 20.1** shows a section through the skin on the back of the hand.

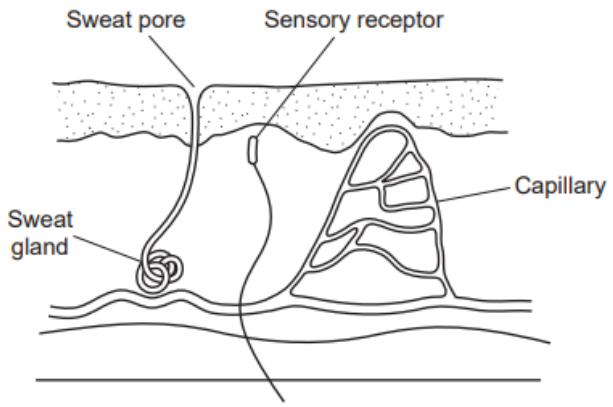


Fig. 20.1

(a) **(i)** Which part of the skin detects something touching the back of the hand?

..... **[1]**

B)

(ii) The body responds when something touches the back of the hand.

Complete the sentences to explain how this happens.

The ..... receives impulses from the skin along sensory neurones.

These impulses are processed and other impulses are sent along

..... neurones to bring about responses.

[2]

Q8. (2021)

2 Which row in the table shows the order of neurones an impulse travels through in a reflex arc?

	Order of neurones in a reflex arc		
	First	**Second**	**Third**
A	sensory neurone	motor neurone	relay neurone
B	motor neurone	relay neurone	sensory neurone
C	motor neurone	sensory neurone	relay neurone
D	sensory neurone	relay neurone	motor neurone

Your answer ☐ **[1]**

Q9. (2021)

7 Which part of the brain functions as an endocrine gland?

A Cerebellum

B Cerebrum

C Medulla

D Pituitary

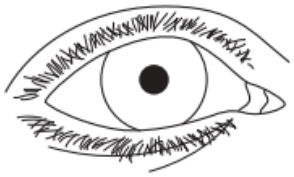
Your answer ☐ **[1]**

Q10. (2021)

8 The eye changes in different light conditions.



View **A**



View **B**

What statement explains the changes between view **A** and view **B**?

A The iris makes the pupil smaller.

B The iris makes the pupil larger.

C The pupil makes the iris smaller.

D The pupil makes the iris larger.

Your answer ☐ **[1]**

Q11. (2021) – 20a, 20b, 20c, 20d

A)

(ii) The endocrine system is also involved in sending messages.

Describe how the endocrine system sends messages.

.....

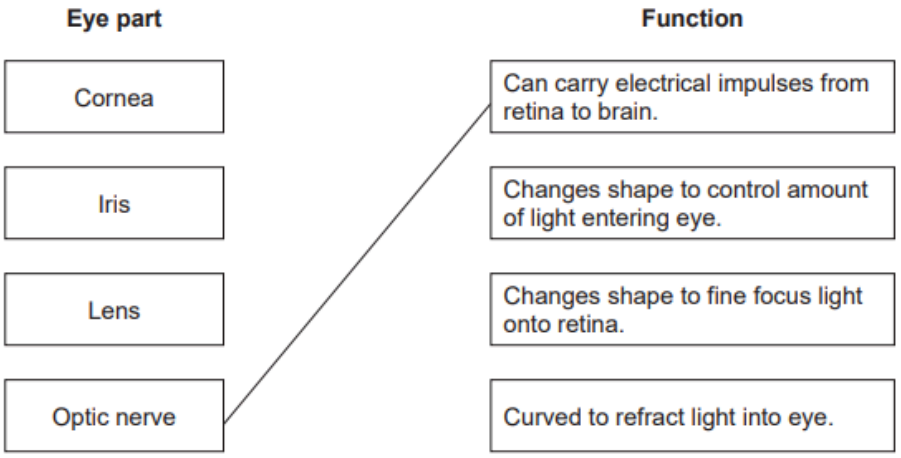
..... **[2]**

B)

(b) The eye is part of the nervous system.

Different parts of the eye can perform different functions to help with sight.

Draw lines to connect the correct **eye part** to the correct **function**.
One line has been drawn for you.



[2]

C)

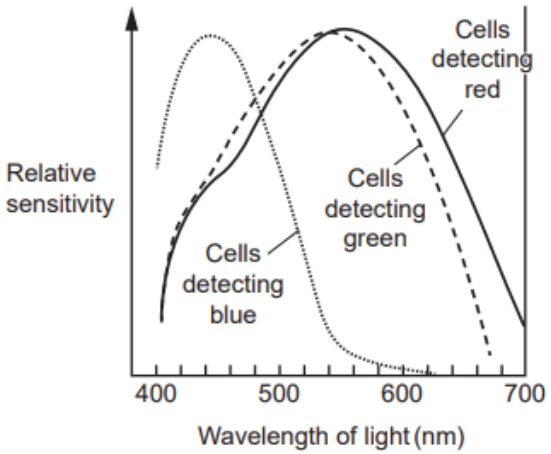
(c) (i)* All colours of visible light can be produced by combinations of blue, green and red light.

Different cells in the eye detect blue, green or red light.

Some people are colour blind because they have damaged cells that detect colours (wavelengths) of light differently.

Fig. 20.2 shows cells detecting colour in normal vision and in someone who is colour blind.

Normal vision



Colour blind

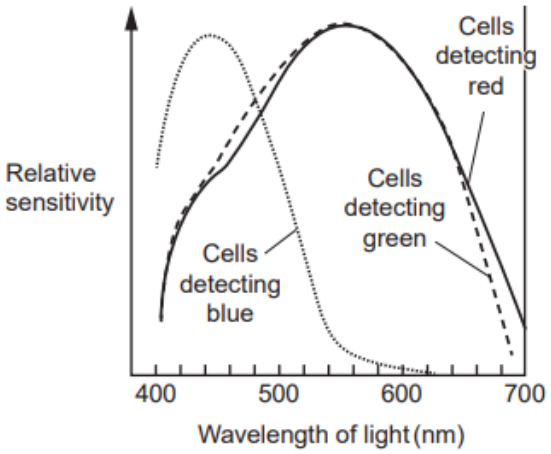


Fig. 20.2

D)

(d) The brain processes information from the eyes. This occurs in the same part of the brain responsible for controlling conscious thought.

Which part of the brain is responsible for processing vision?

Put a (ring) around the correct answer.

cerebrum **cerebellum** **hypothalamus** **medulla**

[1]

If the cells in the eye have the same sensitivity to different colours then the brain cannot tell these colours apart.

Special glasses can be worn to remove colours in the 560 to 640 nm range of visible light.

Identify the part of the eye that contains the different types of cells and use **Fig. 20.2** to explain:

- which colours the colour blind person has trouble identifying
- how the glasses might help treat this colour blindness.

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.... **[6]**

Q12. (2021)

A)

17 The circulatory system and gas exchange system are linked.

Two male students investigate how the type of exercise affects breathing rate.

They each record their breathing rates at rest.

Student A then exercises for 5 minutes by jogging on the spot.
Student B exercises for 5 minutes by doing star jumps.

Both students measure their breathing rate each minute during the 5 minutes of exercise.

(a) What is the **dependent** variable in this investigation?

..... **[1]**

B)

(b) Write down **two** variables the students tried to control in their experiment.

1 .....

2 .....

[2]

C)

(c) Why is it important to first record the students' breathing rate at rest?

..... **[1]**

Q13. (2021) – 18d

(d) Growth in plants is controlled by plant hormones.

Write down **two** other processes in plants that are controlled by plant hormones.

1 .....

2 .....

[2]

Q14. (2021) – 19c, 19d

A)

(c) **(i)** Explain how changes in blood sugar levels caused by diabetes affect the water potential of the blood.

.....

.....

..... **[2]**

B)

(ii) Explain how surrounding cells will be affected by these changes in water potential in the blood.

.....

.....

..... **[2]**

C)

(d) Glucose may be found in the urine of people who have diabetes. This happens if their blood sugar levels are too high.

The diagram shows a kidney tubule (nephron).

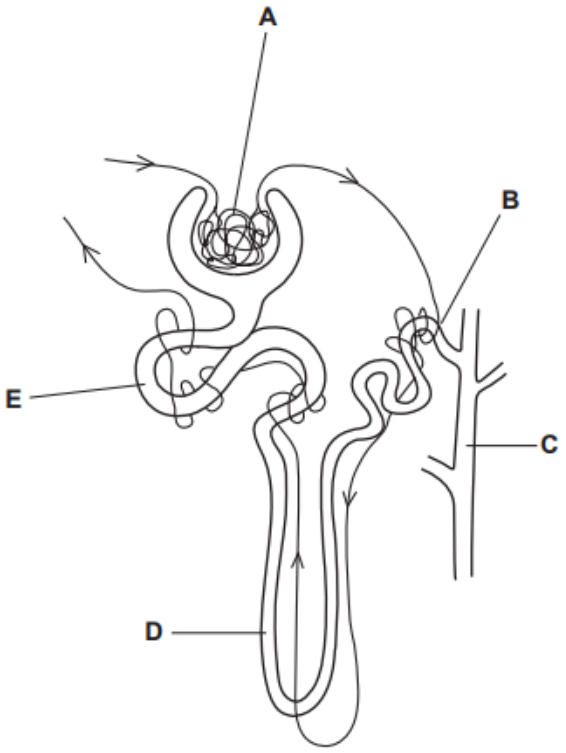


Table 19.2 shows some of the possible ways that diabetes can change kidney function.

For each change in function, write **A**, **B**, **C**, **D** or **E** to identify where in the kidney tubule each change occurs.

Change to kidney function	Part of tubule where change occurs
Glomerulus filters too much glucose from the blood.	
Proximal convoluted tubule only reabsorbs some of the glucose back into the blood.	
Collecting duct transports urine containing glucose.	

Table 19.2

[3]

Q15. (2022)

A)

20 **(a)** A person is finding it difficult to read road signs at a distance whilst driving.

(i) Describe the eye defect this person could have.

.....

.....

..... **[2]**

B)

(ii) Suggest how this eye defect can be corrected.

.....

.....

..... **[1]**

C)

(b) Write down the role of the ciliary body in the eye.

.....

..... **[1]**

Q16. (2022)

21* When a fly lands on a horse, the horse's skin shivers.

This response to the fly is a reflex action.

Describe the sequence of events that occurs in the body of the horse to produce this response.

Use ideas about reflex arcs in your answer.

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..... **[6]**

Q17. (2023)

8 A patient is diagnosed with a detached retina.
This means that part of the retina has moved forward, away from the back of the eye.

What will the patient be **unable** to do?

A Change the shape of their lens

B Control the amount of light entering the eye

C See colours

D See objects clearly

Your answer ☐ **[1]**

Q18. (2023)

14 Which statement about type 1 diabetes is correct?

A It can be treated with insulin.

B It is caused by overproduction of insulin.

C It is usually detected later in life.

D It should be controlled by exercise and diet alone.

Your answer ☐ **[1]**

Q19. (2023)

A)

(b) Three people each make a comment about this diet.

Person **A**: People who are very overweight could lose weight if they went on this diet and this may make them feel better about themselves.

Person **B**: This diet could be harmful to people with underlying health conditions, such as diabetes.

Person **C**: There are dangers to following this diet but being very overweight also causes many health issues.

Which person is discussing both the risks **and** benefits of following this diet?
Explain your answer.

Person .....

Explanation .....

.....

.....

[3]

B)

(c) A class is discussing how to test food to see if it contains carbohydrates.
A student says 'You need to do **two** different named tests to see if carbohydrates are present'.

Explain why this student is **correct**.

.....

.....

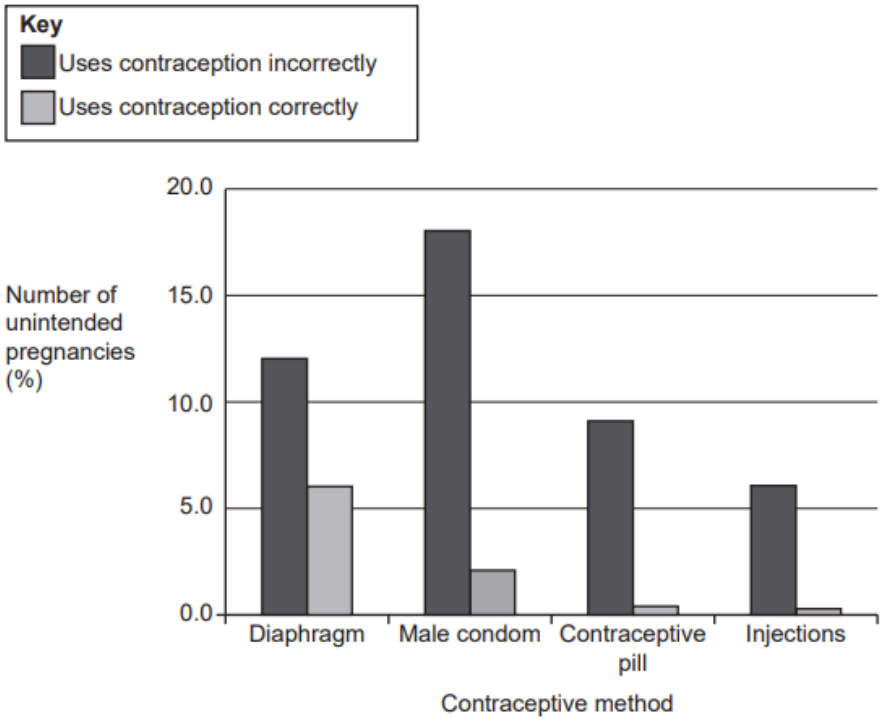
.....

..... **[2]**

Q20. (2023)

A)

22 The graph shows the percentage of unintended pregnancies while using different types of contraception.



(a) Compare the effectiveness of the different types of contraception in preventing pregnancies. Include data from the graph.

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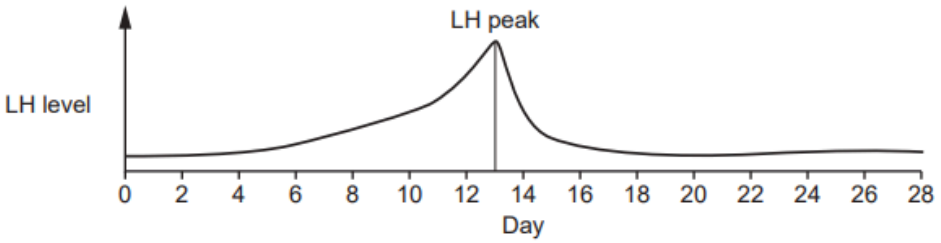
..... **[4]**

B)

(b) A female is trying to get pregnant.

High levels of a hormone called LH stimulate ovulation.

The graph shows the levels of LH throughout the female's menstrual cycle.



When is the female most likely to get pregnant?
Explain your answer.

.....

.....

..... **[2]**

C)

(c) Some females produce low levels of progesterone after an egg has been fertilised.

Suggest how this may affect the uterus lining.

.....

..... **[1]**

Q21. (2024)

7 Which part of the eye controls the size of the pupil?

A Iris

B Lens

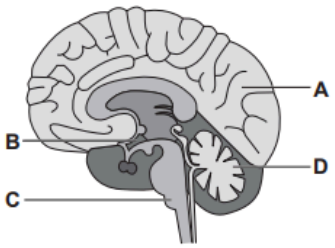
C Optic nerve

D Retina

Your answer ☐ **[1]**

Q22. (2024)

15 The diagram shows the structure of the human brain.



Which part of the brain is highly folded into two hemispheres and controls language and memory?

Your answer ☐ **[1]**

Q23. (2024)

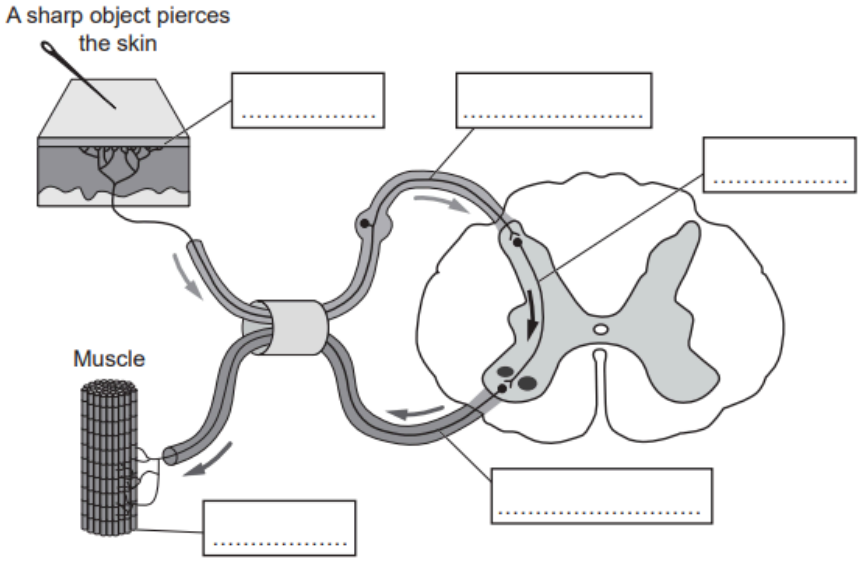
A)

19 The diagram shows the sequence of events that occurs during a reflex arc.

(a) Complete the reflex arc diagram.

Use the words from the list.

effector	**motor neurone**	**receptor**	**relay neurone**
sensory neurone	**stimulus**	**synapse**	

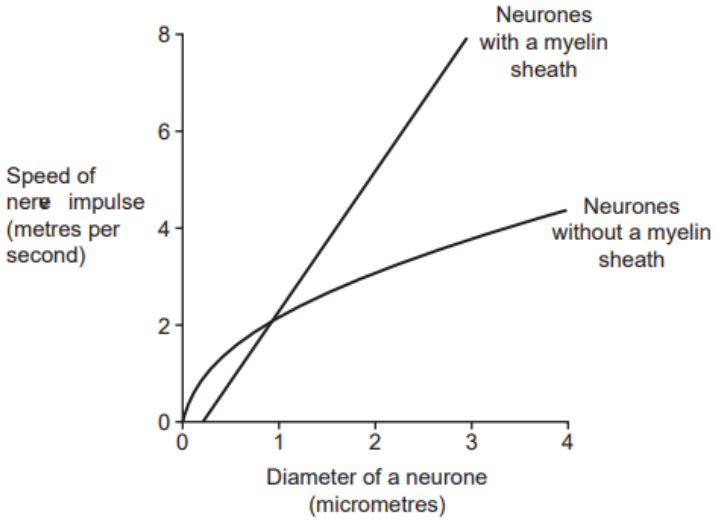


[5]

B)

(b) Neurones can be divided into two types depending on whether they have a myelin sheath.

The graph shows the relationship between the speed of nerve impulses and the diameter of neurones, for both types of neurones.



Complete the sentences using the information from the graph.

Use numbers or words from the list.

1.0	**4.0**	**8.0**	**faster**	**identical**
negative	**positive**	**slower**		

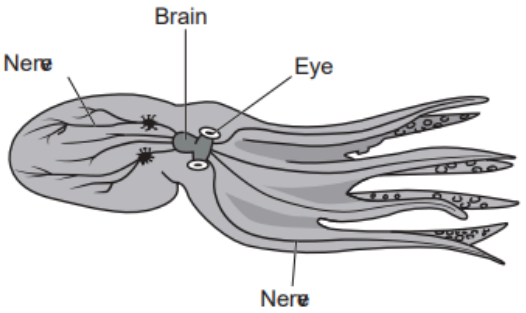
For both types of neurones there is a ..... correlation between the diameter of the neurone and the speed of nerve impulses.

At a diameter of ..... micrometres, the speed of nerve impulses are the same in both types of neurone.

Above that diameter, the speed is ..... in the neurones with a myelin sheath. **[3]**

C)

(c) The diagram shows the nervous system of the octopus.



(i) Both the octopus and humans have a central nervous system (CNS).

Give **one** similarity and **one** difference between the octopus CNS and the human CNS.

Similarity .....

.....

Difference .....

.....

[2]

D)

(ii) In both the octopus and the human nervous systems, the eyes are close to the brain.

Suggest **one** advantage of this arrangement.

.....

..... **[1]**