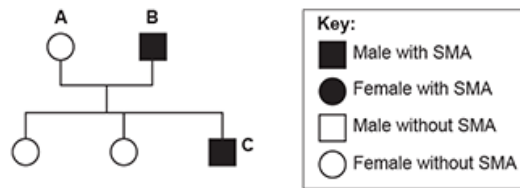


### 1. Spinal muscular atrophy (SMA) is a genetic disease.

The diagram shows a family tree which contains some people with SMA.

SMA is caused by a recessive allele.



- i. Use the key to give the phenotype of person **A**.

[1]

- ii. Which term describes the genotype of person **B**?

Tick (✓) **one** box.

Heterozygous

☐

Homozygous dominant

☐

Homozygous recessive

☐

[1]

- iii. People that have SMA cannot produce a protein that is needed for their motor neurones to function.

Explain why person **C** has difficulty moving their legs.

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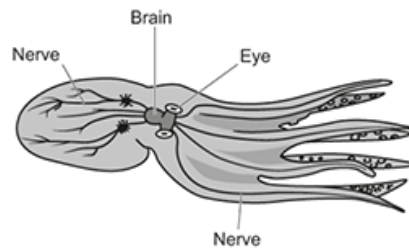
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[3]

2. 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]

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

Suggest **one** advantage of this arrangement.

----- [1]

3. Which part of the eye controls the size of the pupil?

- A Iris
- B Lens
- C Optic nerve
- D Retina

Your answer

☐

[1]

4. The table lists some structures in the human body.

Identify whether each structure is:

- part of the nervous system
- part of the endocrine (hormonal) system
- **not** part of either system.

Tick (✓) **one** box in each row.

Structure	Part of the nervous system	Part of the endocrine system	Not part of either system
Insulin producing cells in the pancreas			
Kidney tubules			
Pituitary gland			
Spinal cord			
Temperature receptors in the skin			

[5]

5. 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]

6. A person has a disease that has destroyed the motor neurones in their leg.

What is the most likely outcome for the person?

	Can move leg	Can feel foot being tickled
A	✓	X
B	✓	✓
C	X	✓
D	X	X

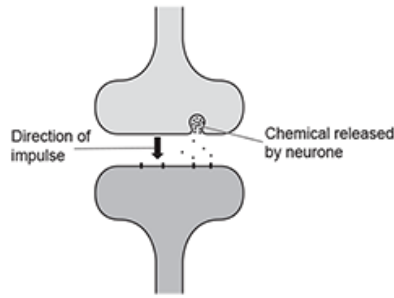
Your answer

☐

[1]

**7. Synapses are junctions between neurones.**

For an impulse to be generated in another neurone, a chemical must be released into the gap.



Which word describes how the chemical moves across the gap?

- A** Diffusion
- B** Osmosis
- C** Respiration
- D** Transpiration

Your answer

**[1]**

**8. Amyloidosis is a group of inherited conditions that affect people's health.**

The most common type of amyloidosis is caused by a dominant allele (**A**) of a gene.

The allele **A** codes for a harmful protein called amyloid.

Amyloid protein is made by blood cells called plasma cells.

Amyloid can stop the pancreas releasing insulin.

It can also prevent sensory neurones from working.

Explain why person **2** starts to develop symptoms of amyloidosis **and** suggest what these symptoms might be.

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**[3]**

**9(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.

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----- **[2]**

- ii. Suggest how this eye defect can be corrected.

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----- **[1]**

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

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----- **[1]**

**(c).** A condition called dry eye can be caused by damage to the corneal cells in the eye.

- Dry eye can now be treated using stem cells.
- The stem cells are taken from the patient's own tissues and not from a donor.

Suggest why the stem cells used in this treatment are taken from the patient's own tissues.

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----- **[1]**

Use ideas about reflex arcs in your answer.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

**[6]**

**END OF QUESTION PAPER**