

1. The table shows some details of three genetic diseases that can affect humans.

Disease	Cause	Number of UK cases	Effect
Huntington's	a dominant allele	12 in 100 000 people	The mutation produces a protein that stops the cerebrum communicating with the spinal cord.
Muscular dystrophy (MD)	a recessive allele	1 in 4 000 males	The mutation prevents a muscle protein being made.
Spinal muscular atrophy (SMA)	a recessive allele	1 in 10 000 people	The mutation prevents a protein being made that is needed for motor neurones to work.

All three diseases affect proteins in different parts of the body.

Explain why each of these diseases cause difficulty in moving the legs.

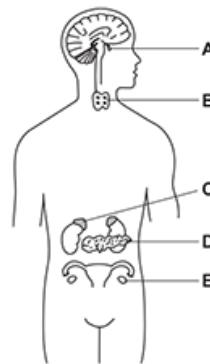
Huntington's

MD

SMA

[3]

2. This diagram shows the position of different endocrine glands in the body.



Identify the letter on the diagram that shows the position of:

- the pituitary gland

- the gland that produces thyroxine

[2]

3(a). Fig. 19.1 shows the nervous system of an octopus.

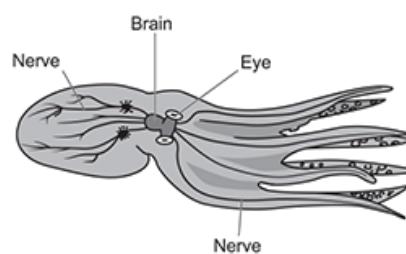


Fig. 19.1

Compare the nervous system of the octopus in **Fig. 19.1** to that of a human.

[3]

(b). Fig. 19.2 shows changes in an octopus's eye when it adjusts from focusing on a distant object to focusing on a near object.

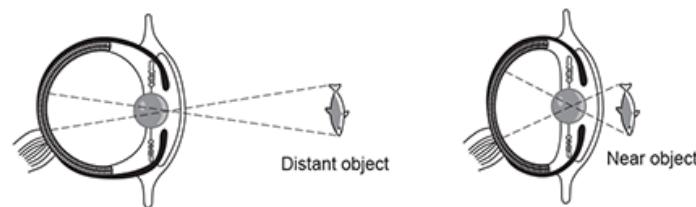


Fig. 19.2

Give **two** differences, shown on the diagram, between this process in the octopus compared to in a human.

A horizontal line with two vertical tick marks. The top tick mark is labeled '1' and the bottom tick mark is labeled '2'.

[2]

(c). The table shows some data from three species.

Species	Eye size (mm)	Body mass (g)	Eye size : body mass ratio
Human	24	64 008	1:2667
Octopus	20	200	
Owl	28	784	1:28

i. Calculate the eye size : body mass ratio for the octopus.

Ratio = [2]

ii. Owls hunt at night.

Explain how their eye size : body mass ratio makes them adapted to hunt at night.

[2]

4. Sensory neurones conduct impulses towards the central nervous system.

Which row is correct about what is included in the structure of a sensory neurone?

	Axon	Dendron
A	✓	✓
B	✓	X
C	X	✓
D	X	X

Your answer

[1]

5. A person focuses on a distant object.

Which row describes the ciliary muscles and suspensory ligaments in their eye?

	Ciliary muscles	Suspensory ligaments
A	contracted	loose
B	contracted	tight
C	relaxed	loose
D	relaxed	tight

Your answer

[1]

6. Hormones are part of the endocrine system.

Describe **two** differences between the endocrine system and the nervous system.

1

2

[2]

7. What is the correct sequence in a reflex arc?

- A** Effector → receptor → sensory neurone → relay neurone → motor neurone
- B** Motor neurone → sensory neurone → relay neurone → effector → receptor
- C** Receptor → sensory neurone → relay neurone → motor neurone → effector
- D** Receptor → relay neurone → sensory neurone → effector → motor neurone

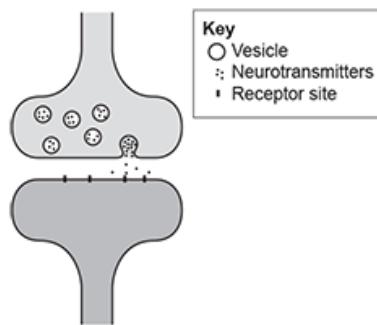
Your answer

[1]

8. Synapses are junctions between neurones.

For an impulse to be generated in another neurone, a neurotransmitter chemical diffuses across the gap and binds to receptor sites.

This process is shown in the diagram.



Which direction can an impulse pass across a synapse?

- A** Only from the neurone that contains the vesicles to the neurone that contains the receptor sites
- B** Only from the neurone that has the receptor sites to the neurone that contains the vesicles
- C** Either way across a synapse because the neurotransmitter can diffuse either way
- D** Either way across a synapse because the neurotransmitter is produced by both neurones

Your answer

[1]

9. In an enzyme experiment, a student tries to measure pH by dipping universal indicator paper into a solution.

They then use a pH chart in their textbook.

They find it difficult to compare the indicator paper with the pH chart and cannot read the pH numbers on the chart.

Which statement could explain why?

- A** The student is colour blind.
- B** The student is colour blind and long-sighted.
- C** The student is colour blind and short-sighted.
- D** The student is short-sighted.

Your answer

[1]

10. Hypothyroidism occurs when the body has an underactive thyroid gland.

Explain why people with hypothyroidism can have less tolerance to cold conditions.

[2]

11. In 2018, a newspaper headline suggested that a cure for blindness had been found.

The newspaper was reporting on a study looking at operations in patients with age-related macular degeneration (AMD). In AMD, part of the retina is damaged.

Describe the role of the retina **and** suggest why damage to this part of the eye could cause blindness.

[2]

END OF QUESTION PAPER