CAMBRIDGE IGCSE BIOLOGY · 0610

BIOLOGY



EXAM QUESTION PACK

TOPIC 14: COORDINATION AND RESPONSE

SCORE	PERCENTAGE
/	%

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Coordination and response – 2023 November IGCSE 0610

1. Nov/2023 /Paper_ 0610/11/No.24

Which organ produces insulin?

A adrenal gland

B liver

C ovary

D pancreas

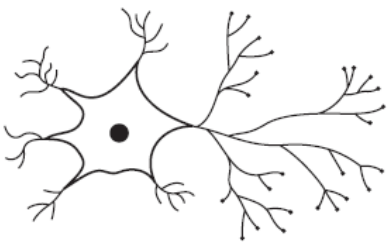
2. Nov/2023 /Paper_ 0610/11/No.26

The diagrams show three types of neurones.

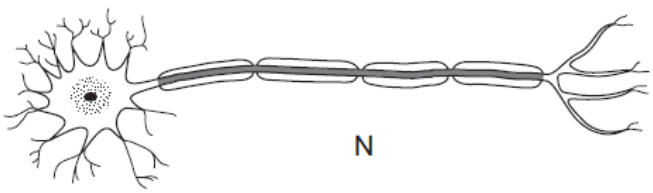


L

NOT TO SCALE



M



N

Which sequence shows the direction that impulses will travel during a reflex action?

A L → M → N

B M → L → N

C M → N → L

D N → M → L

3. Nov/2023 /Paper_ 0610/11/No.27

Which part of the eye detects red light?

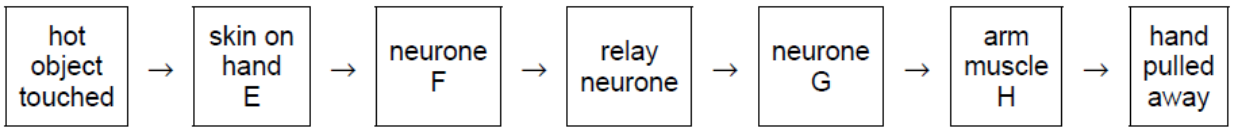
A cornea

B iris

C optic nerve

D retina

4.



Which letter correctly identifies a structure?

A E is called the effector.

B F is called the motor neurone.

C G is called the motor neurone.

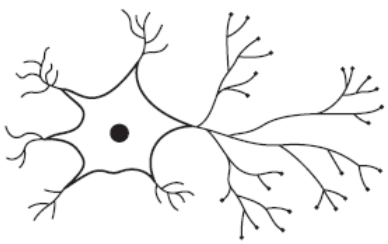
D H is called the receptor.

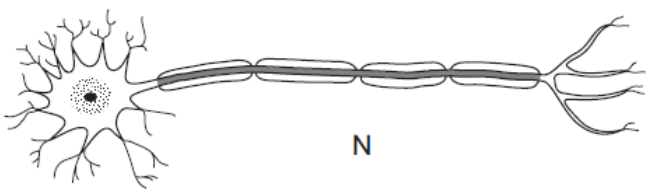
5. Nov/2023 /Paper_ 0610/21/No.26

The diagrams show three types of neurones.



NOT TO SCALE





Which sequence shows the direction that impulses will travel during a reflex action?

A L → M → N

B M → L → N

C M → N → L

D N → M → L

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6. Nov/2023 /Paper_ 0610/21/No.27

Which statement about rods and cones in the eye is correct?

A Both rods and cones detect different colours of light.

B Only cones are present in the blind spot.

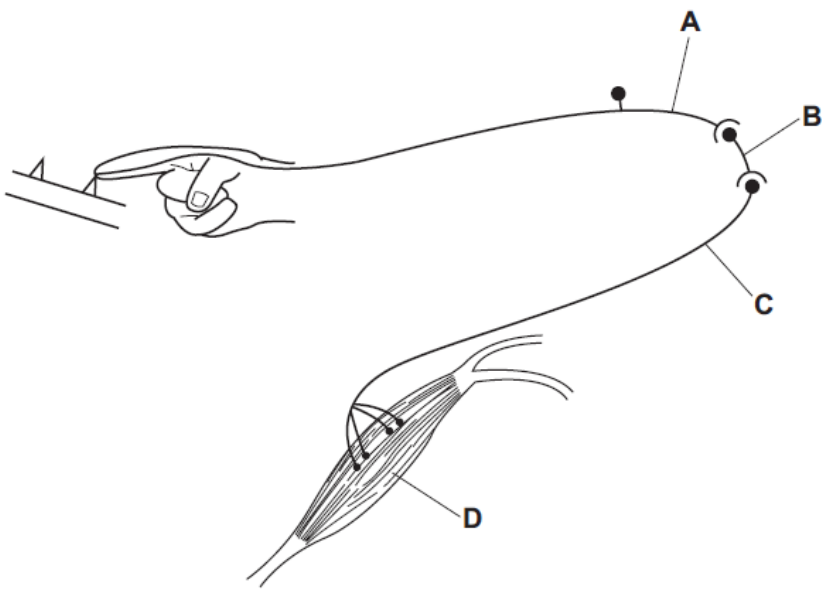
C Rods are more sensitive than cones in low light intensity.

D There are three types of rods but only one type of cone.

7. Nov/2023 /Paper_ 0610/22/No.26

The diagram shows a reflex arc in a human nervous system. The person's finger has just made contact with a sharp object.

Which part is the motor neurone?



8. Nov/2023 /Paper_ 0610/22/No.27

Which hormones can increase blood glucose concentration?

A adrenaline and insulin

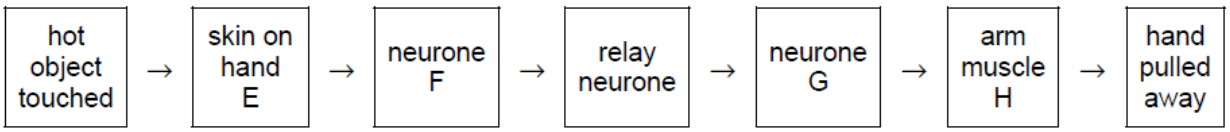
B adrenaline and glucagon

C adrenaline only

D glucagon only

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9.



Which letter correctly identifies a structure?

A E is called the effector.

B F is called the motor neurone.

C G is called the motor neurone.

D H is called the receptor.

10. Nov/2023 /Paper_ 0610/23/No.27

A light source is placed on one side of a growing plant.

What is the correct explanation of the role of auxin in shoot growth?

A Auxin is equally distributed in response to light and stimulates cell elongation.

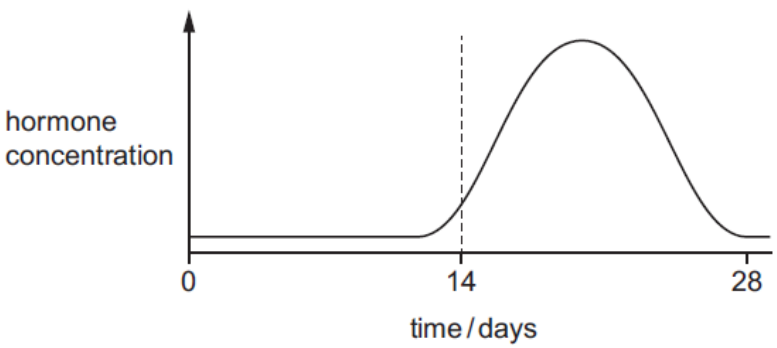
B Auxin is equally distributed in response to light and inhibits cell elongation.

C Auxin is unequally distributed in response to light and stimulates cell elongation.

D Auxin is unequally distributed in response to light and inhibits cell elongation.

11. Nov/2023 /Paper_ 0610/23/No.32

The graph shows the changes in the concentration of a hormone that is involved in controlling the menstrual cycle.



What is the hormone?

A FSH

B LH

C oestrogen

D progesterone

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(a) (i) Frogs are classified as amphibians.

State **two** features of amphibians that distinguish them from all other vertebrates.

1 .....

2 .....

[2]

(ii) Fig. 3.1 is a photograph of a cross-section of a frog's eye.

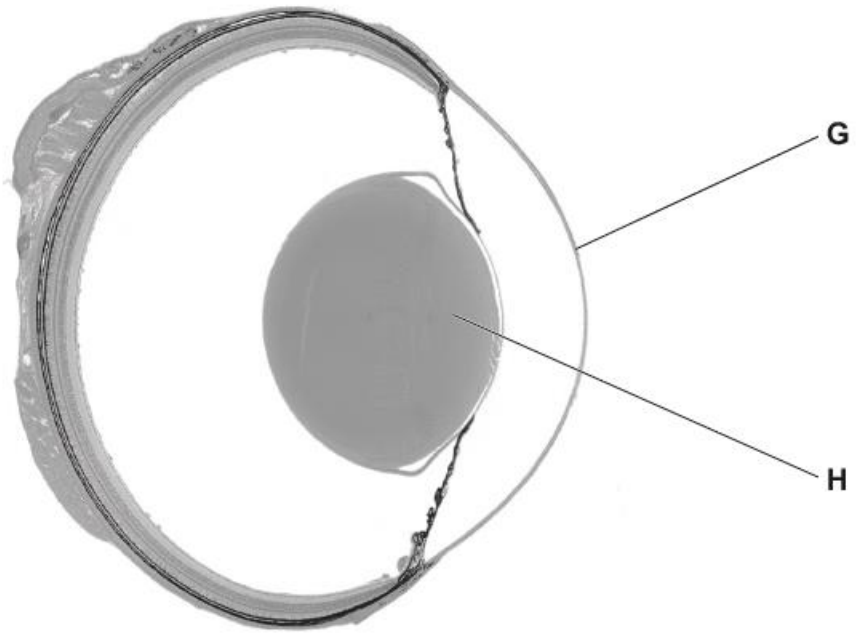


Fig. 3.1

Identify the structures labelled **G** and **H** in Fig. 3.1.

G .....

H .....

[2]

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(b) Fig. 3.2 is a diagram of a rod cell and a cone cell from a human eye.

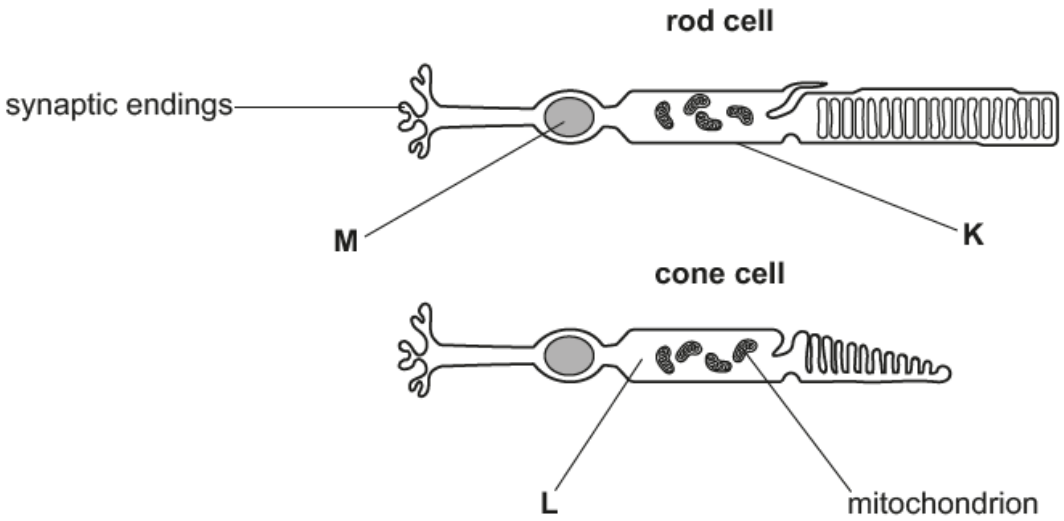


Fig. 3.2

(i) Identify cell structures **K**, **L** and **M** in Fig. 3.2.

K .....

L .....

M .....

[3]

(ii) State the names of the **two** parts of the mammalian central nervous system.

1 .....

2 .....

[1]

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(c) Fig. 3.3 is a graph showing the distribution of rod cells and cone cells across the retina in a human eye.

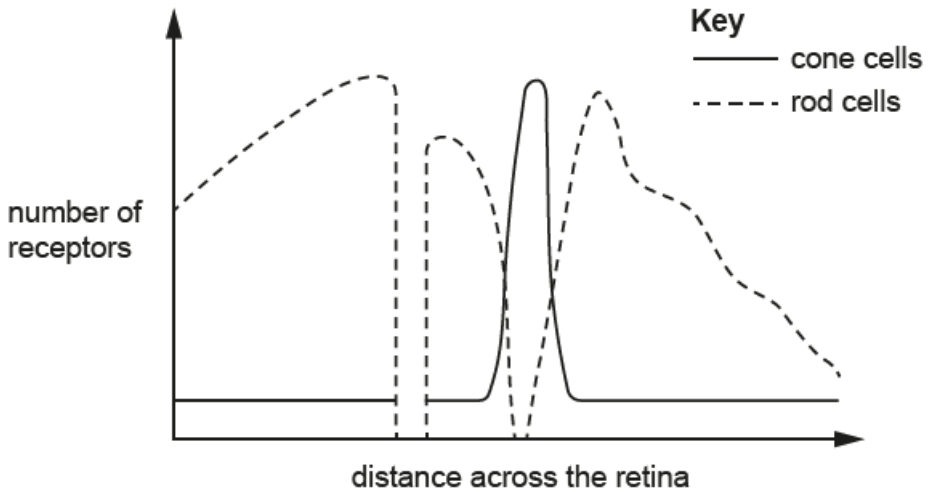


Fig. 3.3

(i) **On Fig. 3.3** draw:

- the letter **P** to show the location of the fovea
- the letter **Q** to show the location of the blind spot.

[2]

(ii) Describe and explain the distribution of rod cells and cone cells shown in Fig. 3.3.

.....

.....

.....

.....

.....

.....

.....

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.....

.....

..... [5]

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(iii) Some mammals are nocturnal which means they are active at night and sleep during the day.

Suggest how the number and distribution of rod cells and cone cells across the retina of a nocturnal mammal would differ from a human retina.

.....

.....

..... [2]

[Total: 17]

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13. Nov/2023 /Paper_ 0610/42/No.3

Fig. 3.1 is a diagram of the junction between two neurones in a healthy person.

Fig. 3.2 is a diagram of the junction between the same two neurones in a person who has Parkinson's disease. This disease affects the nervous system.

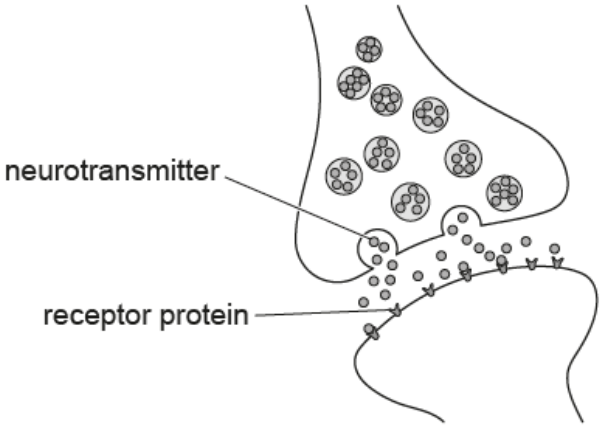


Fig. 3.1

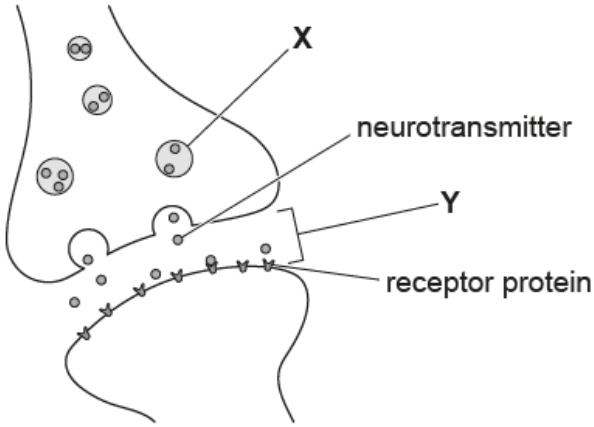


Fig. 3.2

(a) Identify the parts labelled **X** and **Y** in Fig. 3.2.

X .....

Y .....

[2]

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(b) Parkinson's disease affects neurones in the brain that are responsible for movement.

Using the information in Fig. 3.1 and Fig. 3.2, suggest **and** explain the effect of Parkinson's disease on a person's movement.

.....

.....

.....

.....

.....

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.....

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.....

.....

..... [5]

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(c) Describe **two** ways nervous control differs from hormonal control.

1 .....

.....

2 .....

.....

[2]

(d) **(i)** The shape of the receptor proteins shown in Fig. 3.1 and Fig. 3.2 is important for their function.

Explain how the shape of the receptor proteins is determined.

.....

.....

.....

.....

..... [2]

(ii) Cell membranes also contain protein carriers. Describe the role of protein carriers.

.....

.....

.....

.....

..... [2]

[Total: 13]

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(a) Complete the sentences about the control of body temperature.

The human body maintains a constant internal temperature. This is an example of ..... . When the temperature moves away from the set point, the mechanism of ..... returns the temperature to the set point.

[2]

(b) Fig. 4.1 is a diagram of a section of human skin.

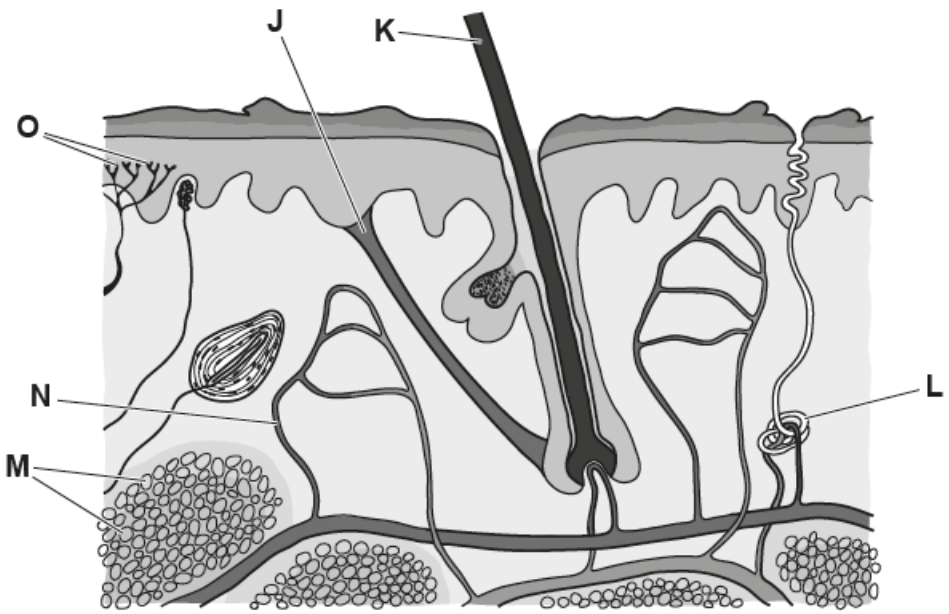


Fig. 4.1

(i) State the names of the structures labelled **L**, **O** and **J** in Fig. 4.1.

L .....

O .....

J .....

[3]

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(ii) Describe how humans maintain a constant body temperature when the external temperature decreases.

Use the structures labelled in Fig. 4.1 in your answer.

.....

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.....

.....

..... [6]

(c) Blood glucose concentration is maintained at a constant set point using the hormones glucagon and insulin.

(i) State the organ that secretes glucagon.

..... [1]

(ii) Describe the effect of glucagon on the body.

.....

.....

..... [1]

[Total: 13]

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Coordination and response – 2023 June IGCSE 0610

1. June/2023/Paper_0610/11/No.27

What is the name of the junction between two neurones?

A effector

B receptor

C gland

D synapse

2. June/2023/Paper_0610/11/No.28

Which statement about adrenaline is correct?

A It decreases the heart rate.

B It decreases the diameter of the pupil.

C It increases the breathing rate.

D It is made in the pancreas.

3. June/2023/Paper_0610/11/No.29

Which words complete the statements?

Plant growth towards light is called .....1..... .

When a plant shoot grows towards a light source, it is showing a .....2..... to light.

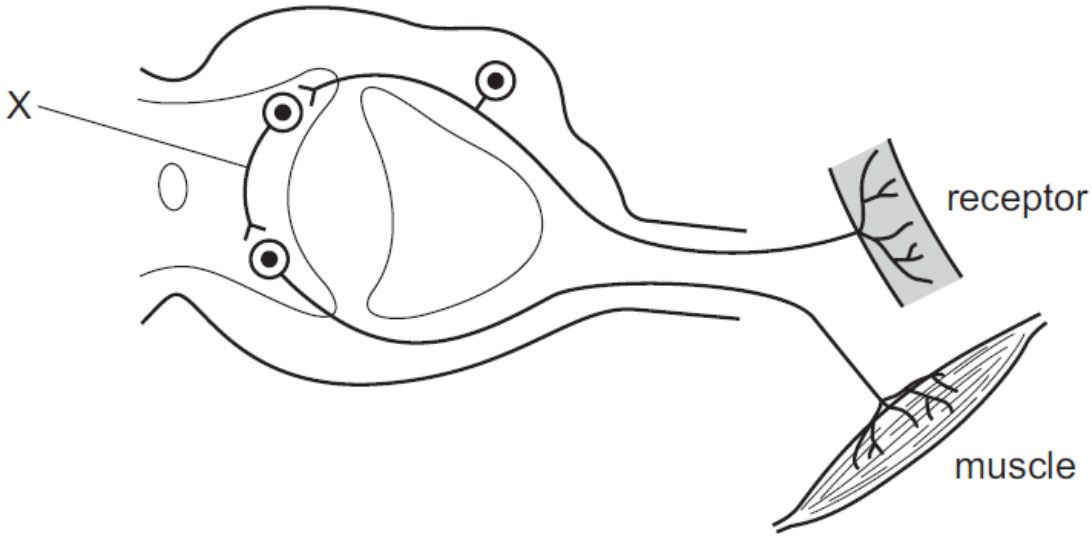
Light acts as the .....3..... .

	1	2	3
A	movement	response	stimulus
B	movement	stimulus	response
C	phototropism	response	stimulus
D	phototropism	stimulus	response

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4. June/2023/Paper_0610/12/No.26

The diagram shows the structures in a reflex arc.



What is X?

A effector

B relay neurone

C sensory neurone

D synapse

5. June/2023/Paper_0610/12/No.27

Changes in light intensity cause changes in the diameter of the pupil in the eye.

Which rows show the pupil reflex?

	light intensity	pupil diameter
1	high	increases
2	high	decreases
3	low	increases
4	low	decreases

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

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6. June/2023/Paper_0610/12/No.28

A hormone is injected into a person to reduce their blood glucose concentration.

Which endocrine gland is **not** functioning properly in a person who needs to have this injection?

A adrenal gland

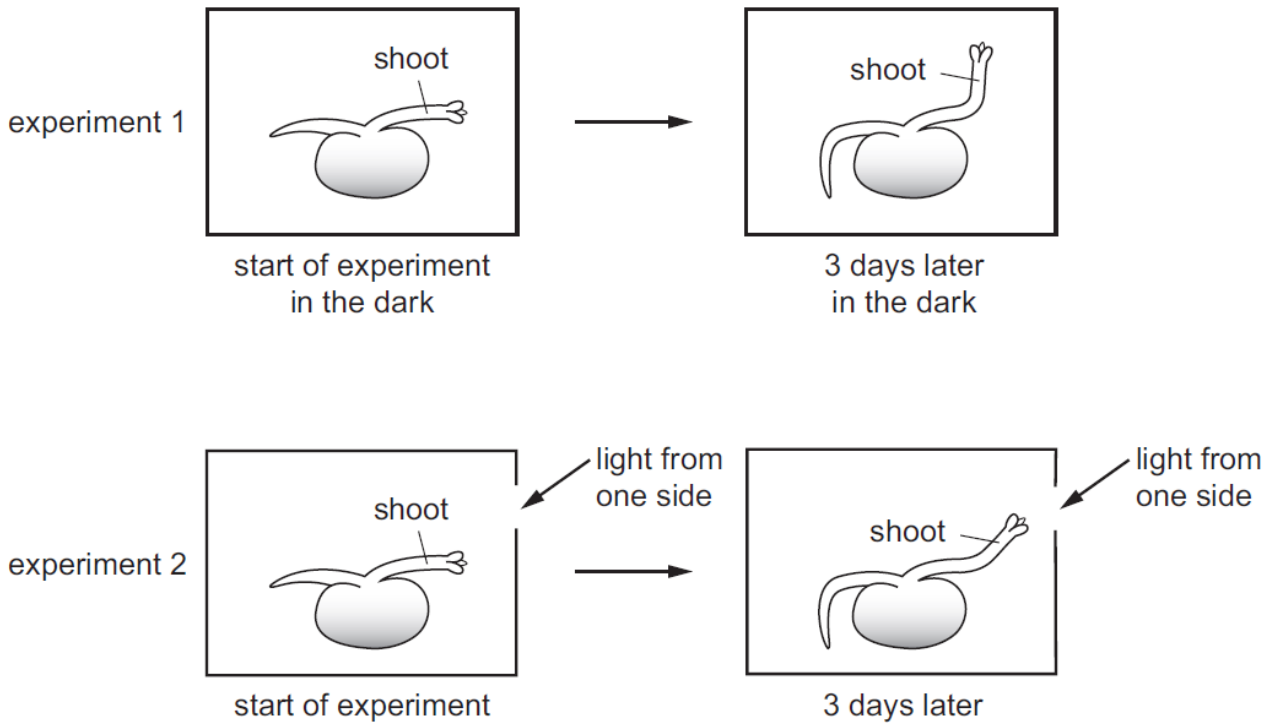
B ovary

C pancreas

D testis

7. June/2023/Paper_0610/13/No.26

The diagram shows seedlings in two experiments on the tropic response of seedlings to gravity and light.



Which stimuli have the seedlings responded to?

	experiment 1	experiment 2
A	gravity and light	light only
B	gravity only	gravity and light
C	gravity and light	light only
D	light only	gravity and light

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8. June/2023/Paper_0610/21/No.24

The events listed involve neurotransmitter molecules at a synapse.

1 They bind with receptor proteins.

2 They diffuse across the synaptic gap.

3 They enter the synaptic gap.

4 They are released from vesicles.

What is the sequence of events that occur when an impulse arrives at the synapse?

A 3 → 2 → 1 → 4

B 4 → 3 → 1 → 2

C 3 → 4 → 1 → 2

D 4 → 3 → 2 → 1

9. June/2023/Paper_0610/21/No.25

What occurs during accommodation to focus on distant objects?

	ciliary muscle	lens shape	suspensory ligaments
A	contracts	fat	slack
B	relaxes	thin	tight
C	contracts	fat	tight
D	relaxes	thin	slack

10. June/2023/Paper_0610/21/No.26

What is a correct statement about auxin in shoots?

A It is made only on the shaded side of the shoot.

B It is more concentrated on the side of the shoot that receives the most light.

C It moves through the shoot by osmosis.

D It stimulates cell elongation.

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11. June/2023/Paper_0610/22/No.6

Which row shows the changes that occur during the germination of a seed?

	respiration rate	amount of energy required	how ions are absorbed
A	decreased	decreased	active transport
B	decreased	increased	diffusion
C	increased	decreased	diffusion
D	increased	increased	active transport

12. June/2023/Paper_0610/22/No.24

Which statement describes what happens during the transmission of an electrical impulse along a reflex arc?

A The relay neurone has receptor proteins which bind with neurotransmitter molecules.

B The relay neurone has vesicles which bind with neurotransmitter molecules.

C The sensory neurone causes receptor proteins to release neurotransmitter molecules.

D The sensory neurone impulses cause vesicles to release receptor protein molecules.

13. June/2023/Paper_0610/22/No.25

During the pupil reflex in bright light, what describes the actions of the muscles in the iris?

A The circular muscles of the iris contract and the radial muscles relax.

B The circular muscles of the iris contract and the radial muscles contract.

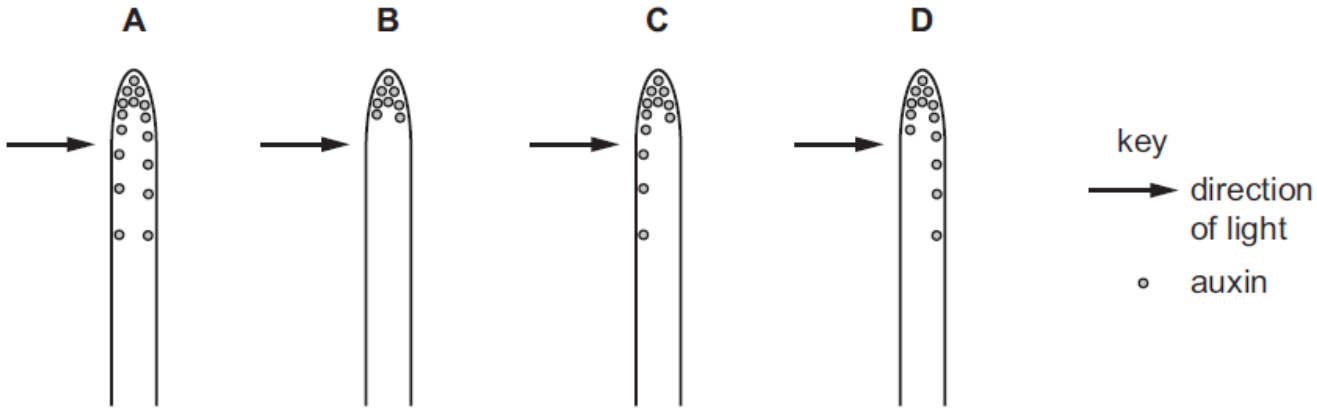
C The circular muscles of the iris relax and the radial muscles contract.

D The circular muscles of the iris relax and the radial muscles relax.

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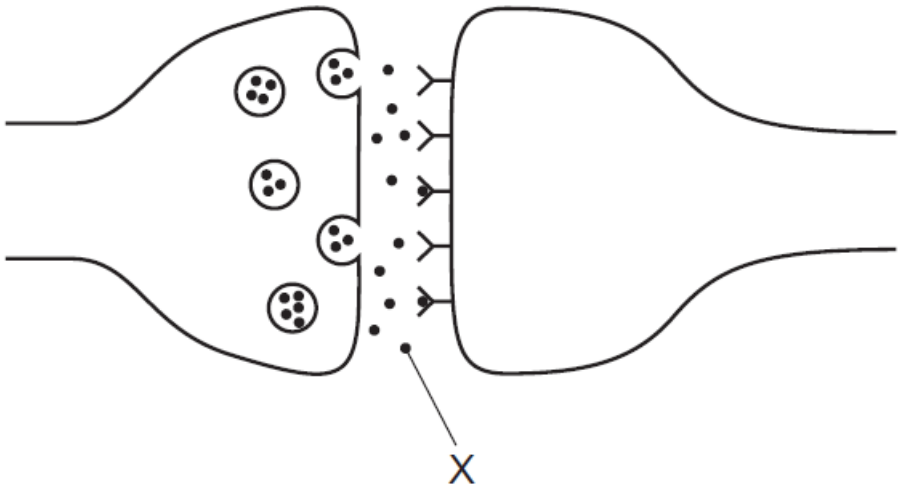
14. June/2023/Paper_0610/22/No.26

Which distribution of auxin will cause the shoot tip to grow towards the light?



15. June/2023/Paper_0610/23/No.24

The diagram shows the gap between two neurones.



What is the name of X?

A neurotransmitter

B receptor

C synapse

D vesicle

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16. June/2023/Paper_0610/23/No.25

Which statements are correct for cone cells in the eye?

1 Cone cells are located in the fovea of the retina.

2 Cone cells detect colour.

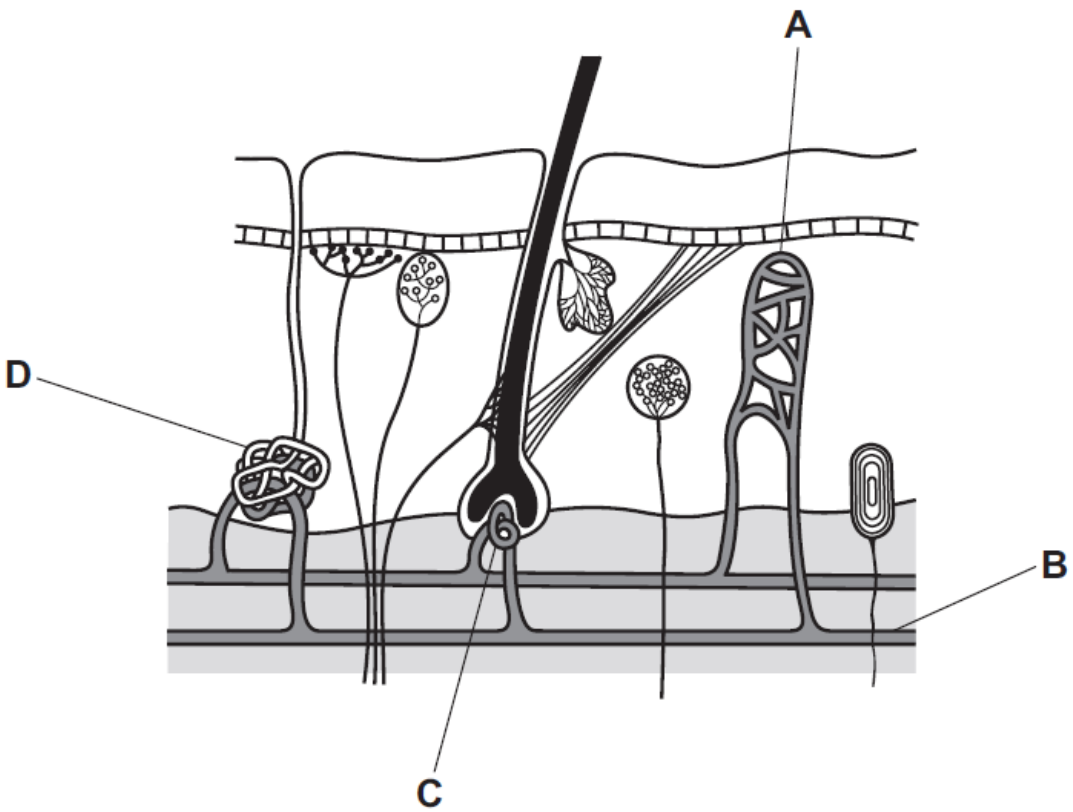
3 Cone cells are more sensitive to light than rod cells.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

17. June/2023/Paper_0610/23/No.26

The diagram shows the structure of the human skin.

Which structure constricts to reduce heat loss?



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18. June/2023/Paper_0610/31/No.8

(a) Fig. 8.1 is a diagram representing a reflex action.

When the knee is tapped with a small rubber hammer, the leg will immediately straighten.

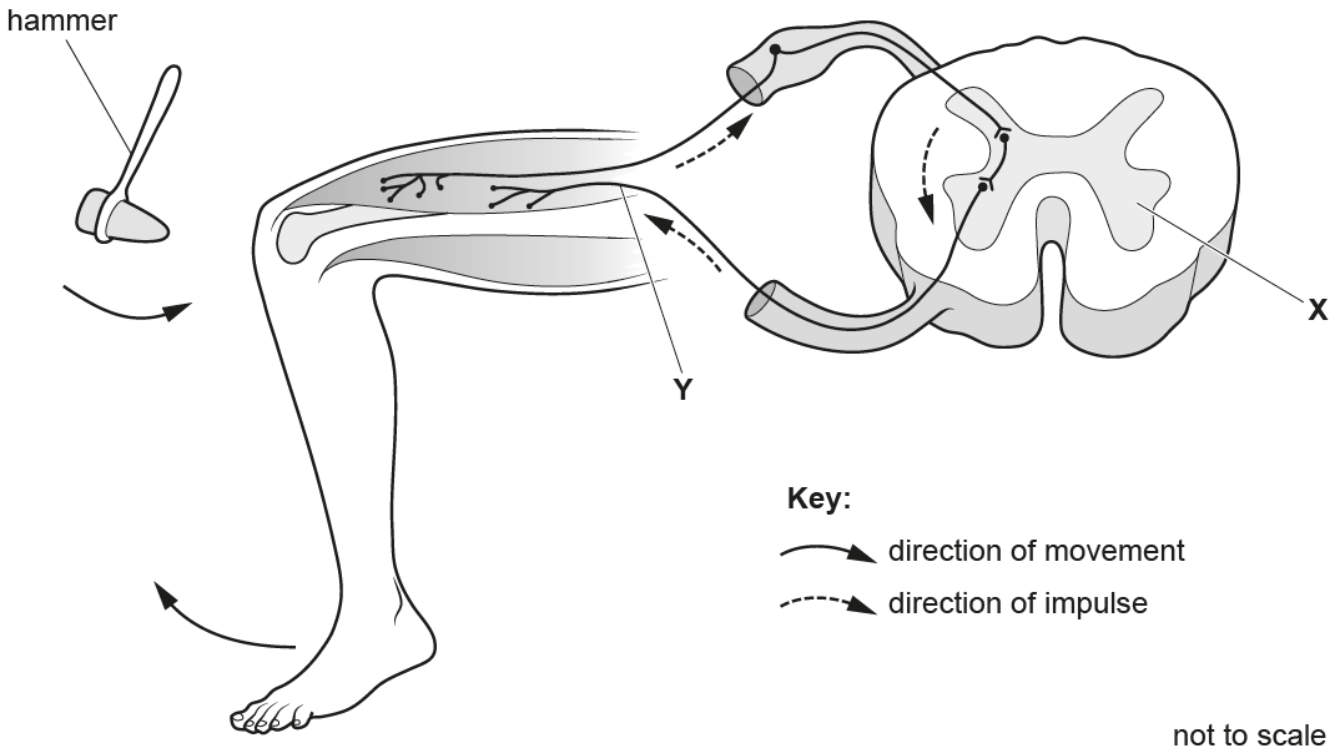


Fig. 8.1

(i) Identify the parts labelled **X** and **Y** in Fig. 8.1.

X .....

Y .....

[2]

(ii) State the name of the effector in the example shown in Fig. 8.1.

..... [1]

(iii) Describe the stimulus in the example shown in Fig. 8.1.

.....

.....

..... [1]

(iv) State **two** features of reflex actions.

1 .....

2 .....

[2]

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19. June/2023/Paper_0610/32/No.6

(a) The eye is a sense organ that contains receptor cells that respond to light.

State **three** other stimuli that sense organs respond to.

1 .....

2 .....

3 .....

[3]

(b) Fig. 6.1 shows a section through the human eye.

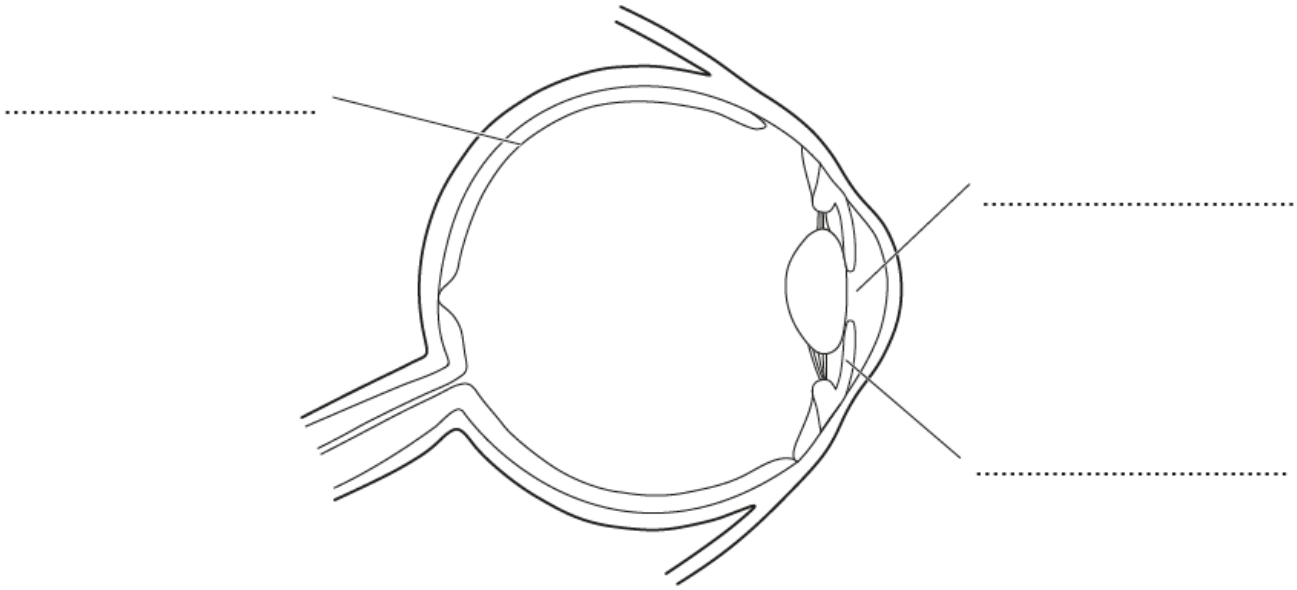


Fig. 6.1

(i) State the names of the structures labelled on Fig. 6.1.

Write your answers in the spaces provided. [3]

(ii) Draw an **X on Fig. 6.1** to show the location of the blind spot. [1]

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(c) **(i)** The sentences describe some of the events that occur when the eye responds to light.

Complete the sentences using the words from the list.

Each word may be used once, more than once or not at all.

absorbed	**brain**	**glands**	**lens**	**muscles**
pupil	**receptors**	**reflected**	**refracted**	

Rays of light reach the front of the eye. Light is ..... through the cornea and the ..... focuses light on the retina. Light ..... in the retina detect light and the optic nerve carries impulses to the ..... .

[4]

(ii) State what happens to the pupil's diameter in a person's eye when they move from a bright room to a dark room.

..... [1]

[Total: 12]

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20. June/2023/Paper_0610/33/No.6

A seedling is a seed which has just started to grow a small root and a small shoot.

(a) State the environmental conditions that a seed requires to grow into a seedling.

.....

.....

.....

..... [3]

(b) Fig. 6.1 shows a drawing of a seedling at the start of an investigation into plant growth responses.

The seedling was attached to a piece of card so that the root and shoot were horizontal.

The card and seedling were placed inside a box that excluded all light. The box was placed on the ground for three days.

Fig. 6.1 shows the apparatus at the start of the investigation.

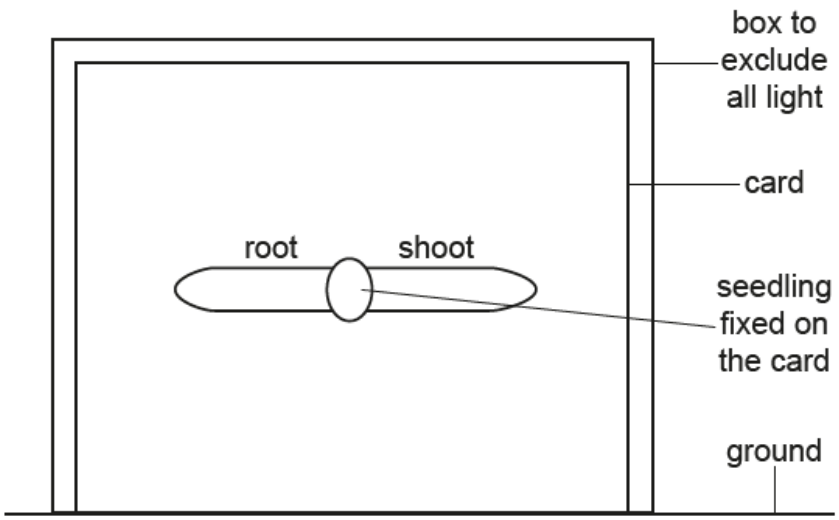


Fig. 6.1

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(i) On Fig. 6.2 draw the expected appearance of the root and shoot after three days in the box.

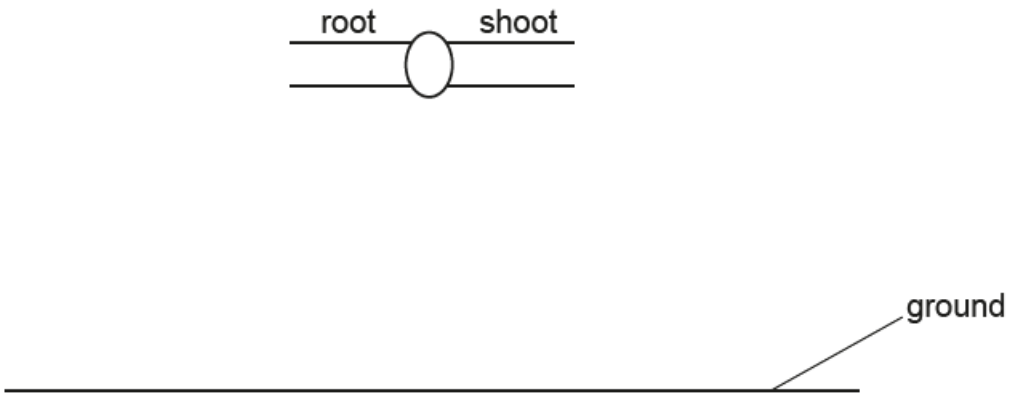


Fig. 6.2

[2]

(ii) State the name of the response shown by the root and the shoot in this investigation.

..... [1]

[Total: 6]

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21. June/2023/Paper_0610/42/No.6

(a) A student investigated plant growth responses in roots and shoots. They used this method:

- Damp cotton wool was placed in two Petri dishes.
- Three bean seedlings were attached to the cotton wool in each Petri dish.
- Each seedling was orientated so that the roots pointed in a different direction in each Petri dish.
- Petri dish 1 was kept on its side in a fixed position.
- Petri dish 2 was kept on its side and rotated constantly.
- Both Petri dishes were kept in the dark.
- Both Petri dishes were kept in these conditions for two days.
- After two days the seedlings were observed.

Fig. 6.1 is a diagram of the apparatus.

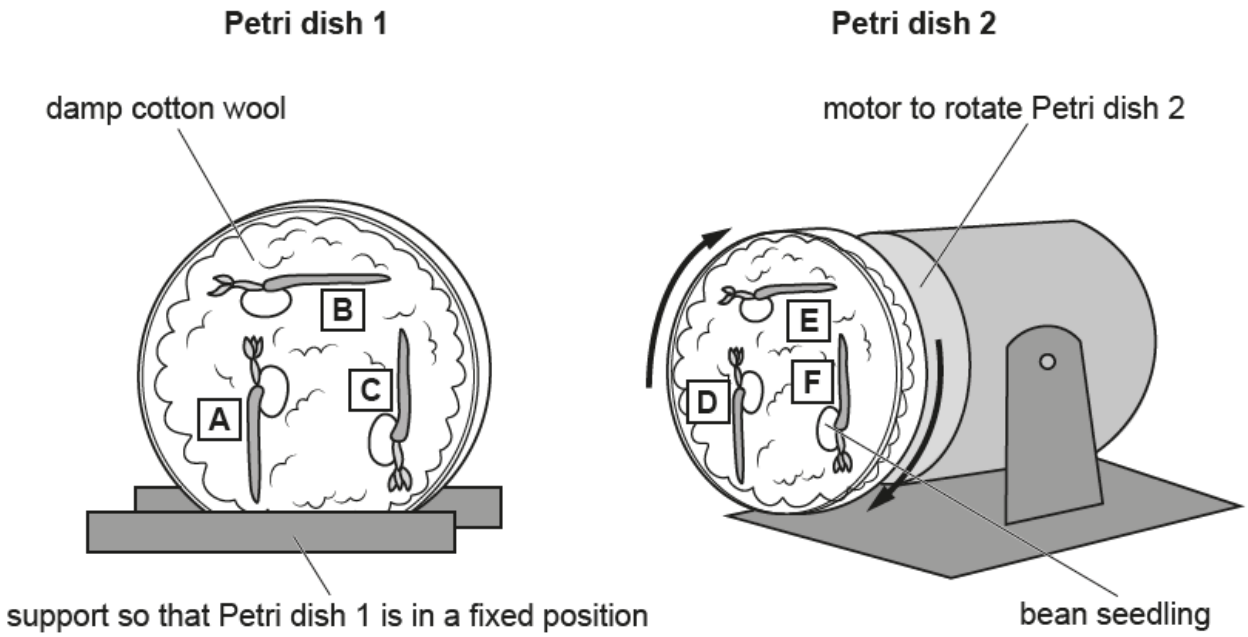


Fig. 6.1

Fig. 6.2 shows the seedlings after two days.

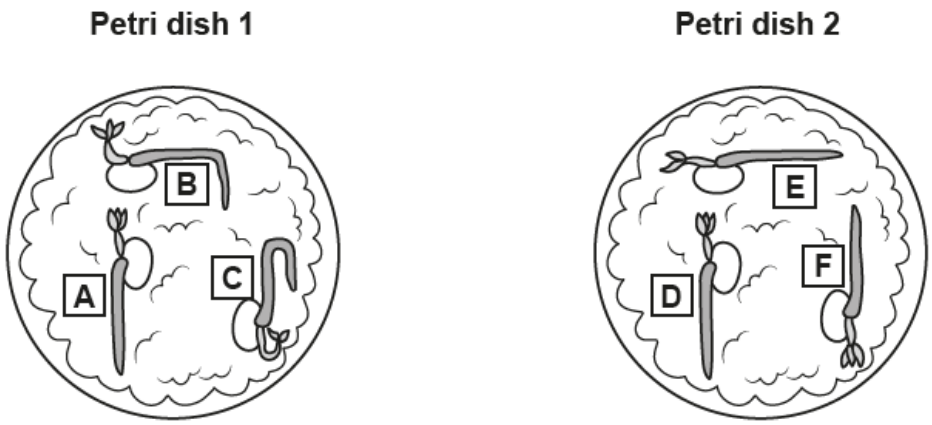


Fig. 6.2

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(i) Describe the pattern of growth of the bean roots and shoots in Petri dish **1** shown in Fig. 6.2.

.....

.....

..... [1]

(ii) State the name of the growth responses observed in the bean roots and shoots.

..... [1]

(iii) Explain how auxin causes the difference in the pattern of growth shown by the shoots of seedlings **B** and **E** shown in Fig. 6.2.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

(b) Seeds require oxygen and water to germinate.

(i) State **one** other environmental condition that affects germination.

..... [1]

(ii) Suggest why oxygen and water are required for germination.

.....

.....

.....

.....

..... [2]

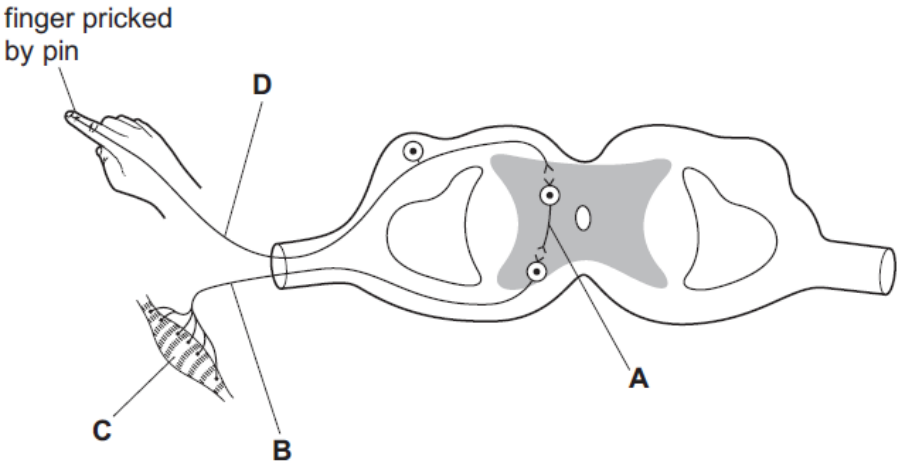
[Total: 10]

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22. March/2023/Paper_ 0610/12/No.26

The diagram shows a reflex arc.

Which label identifies the motor neurone?



23. March/2023/Paper_ 0610/12/No.27

What is the role of insulin?

A It decreases blood glucose concentration.

B It increases blood glucose concentration.

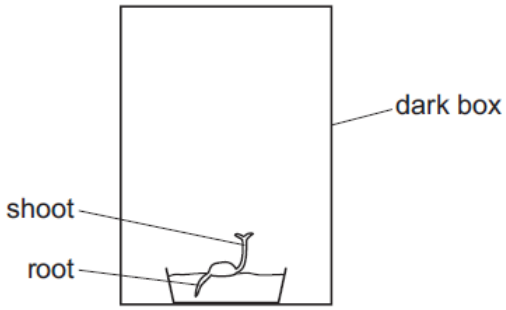
C It decreases blood sucrose concentration.

D It increases blood glycogen concentration.

24. March/2023/Paper_ 0610/12/No.28

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The diagram shows a seedling growing inside a dark box.



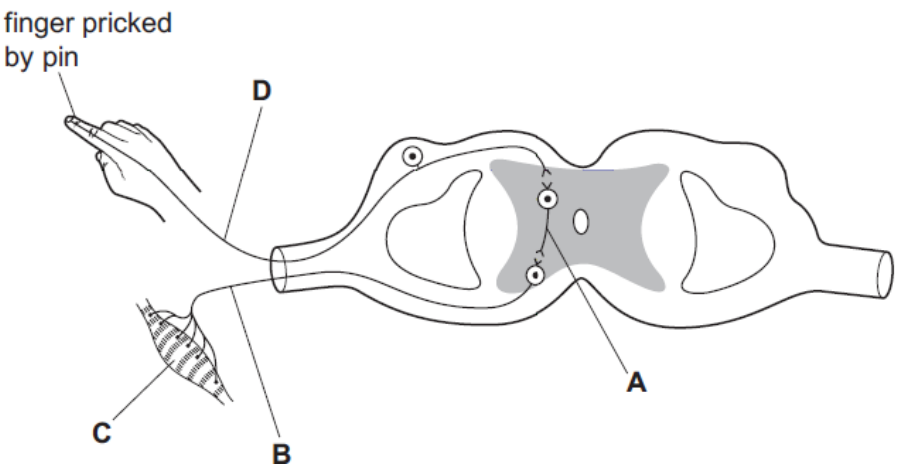
Which type of responses affect the direction of growth of the root and the shoot inside the box?

	response by the root	response by the shoot
A	gravitropism	gravitropism
B	gravitropism	phototropism
C	phototropism	gravitropism
D	phototropism	phototropism

25. March/2023/Paper_ 0610/22/No.24

The diagram shows a reflex arc.

Which label identifies the motor neurone?



26. March/2023/Paper_ 0610/22/No.25

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Which structures contain neurotransmitter molecules in neurones?

A chloroplasts

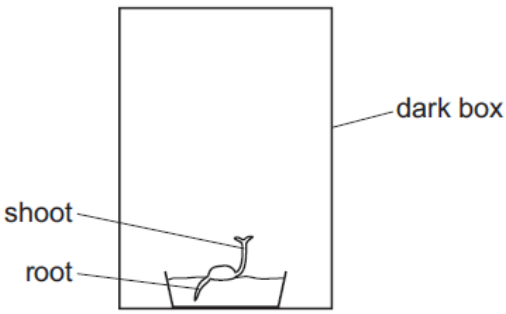
B mitochondria

C ribosomes

D vesicles

27. March/2023/Paper_ 0610/22/No.26

The diagram shows a seedling growing inside a dark box.



Which type of responses affect the direction of growth of the root and the shoot inside the box?

	response by the root	response by the shoot
A	gravitropism	gravitropism
B	gravitropism	phototropism
C	phototropism	gravitropism
D	phototropism	phototropism

28. March/2023/Paper_ 0610/42/No.5

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The eye is a sense organ that is part of the nervous system.

(a) Explain why the eye can be described as a sense organ.

.....

.....

.....

.....

..... [2]

(b) State the **two** parts of the central nervous system.

1 .....

2 .....

[2]

(c) Fig. 5.1 is a diagram of a section through the human eye.

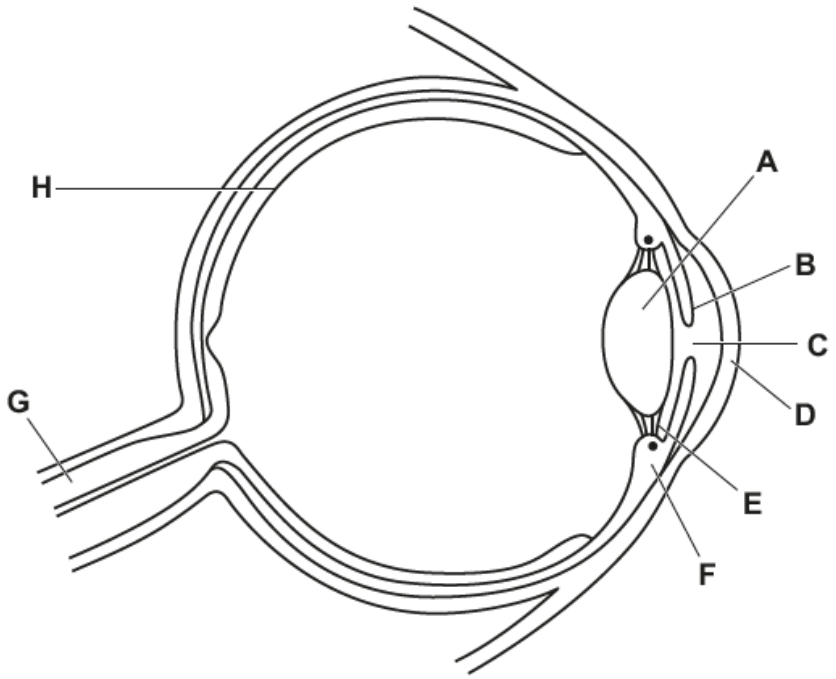


Fig. 5.1

(i) Draw an **X** on Fig. 5.1 to identify the blind spot. [1]

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(ii) Table 5.1 shows some of the parts labelled in Fig. 5.1, their names and their functions.

Complete Table 5.1.

Table 5.1

name of the part	letter in Fig. 5.1	function
	H	
		transmits impulses to the central nervous system
cornea		

[3]

(d) State the names of the **two** effectors that contract and relax during the pupil reflex.

..... and ..... [1]

(e) Explain why a person is unable to focus on distant objects if the suspensory ligaments become permanently overstretched.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 12]

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Coordination and response – 2022 November IGCSE 0610 Biology

1. Nov/2022/Paper_11/No.26

What is the order of structures that a nerve impulse travels through during a reflex action?

A effector → neurones → receptor

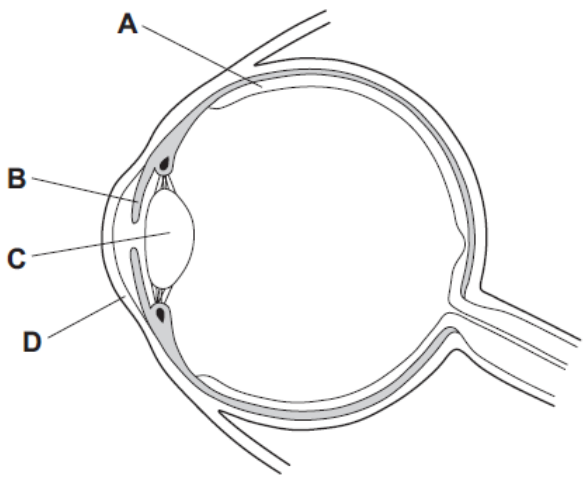
B receptor → neurones → effector

C neurones → effector → receptor

D receptor → effector → neurones

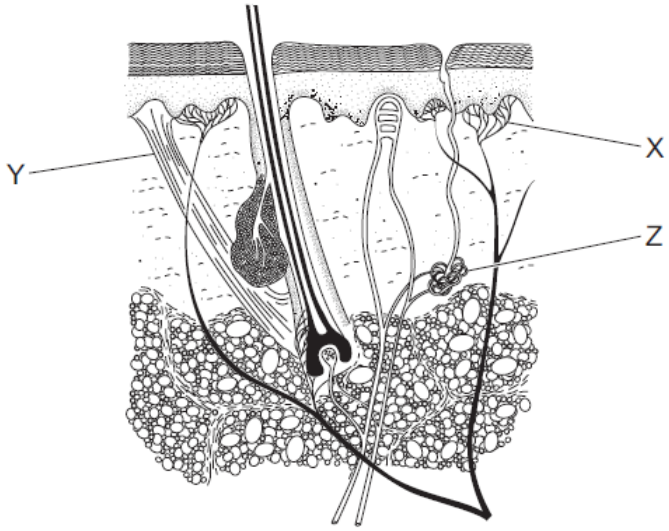
2. Nov/2022/Paper_11/No.27

Which structure can reduce how much light enters the eye?



3. Nov/2022/Paper_11/No.28

The diagram shows a section through human skin.



What are the structures labelled X, Y and Z?

	X	Y	Z
A	receptor	sweat gland	hair erector muscle
B	receptor	hair erector muscle	sweat gland
C	sweat gland	receptor	hair erector muscle
D	sweat gland	hair erector muscle	receptor

4. Nov/2022/Paper_12/No.26

Which part of the eye refracts light?

A cornea

B iris

C pupil

D retina

5. Nov/2022/Paper_12/No.28

Which row about tropic responses is correct?

	gravitropism	phototropism
A	root grows away from gravity	shoot grows away from light source
B	root grows away from gravity	shoot grows towards light source
C	root grows towards gravity	shoot grows away from light source
D	root grows towards gravity	shoot grows towards light source

6. Nov/2022/Paper_13/No.26

A person moves from a place with dim light to a place with bright light.

What will happen to the pupils in the person's eyes?

	size	controlled by
A	decreases	cornea
B	increases	cornea
C	decreases	iris
D	increases	iris

7. Nov/2022/Paper_13/No.27

Which endocrine gland secretes insulin?

A adrenal

B ovary

C pancreas

D testis

8. Nov/2022/Paper_13/No.28

Which factors affect the growth of plants?

A gravity and light only

B gravity, light and temperature

C gravity and temperature only

D light and temperature only

9. Nov/2022/Paper_21/No.24

What is a response to a low concentration of glucose in the blood?

A Glucagon will cause the body to convert glucose into glycogen.

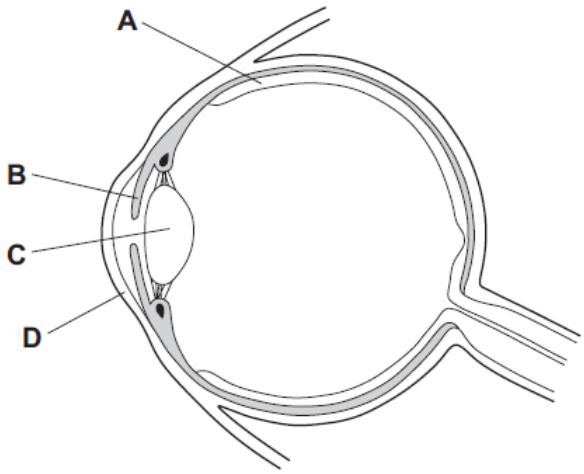
B Glucagon will cause the body to convert glycogen into glucose.

C Insulin will cause the body to convert glucose into glycogen.

D Insulin will cause the body to convert glycogen into glucose.

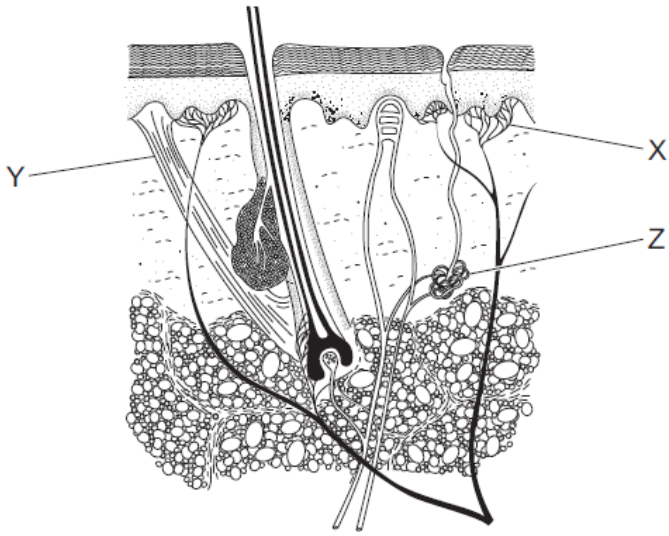
10. Nov/2022/Paper_21/No.25

Which structure can reduce how much light enters the eye?



11. Nov/2022/Paper_21/No.26

The diagram shows a section through human skin.



What are the structures labelled X, Y and Z?

	X	Y	Z
A	receptor	sweat gland	hair erector muscle
B	receptor	hair erector muscle	sweat gland
C	sweat gland	receptor	hair erector muscle
D	sweat gland	hair erector muscle	receptor

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12. Nov/2022/Paper_22/No.24

What is a response to a low concentration of glucose in the blood?

A Glucagon will cause the body to convert glucose into glycogen.

B Glucagon will cause the body to convert glycogen into glucose.

C Insulin will cause the body to convert glucose into glycogen.

D Insulin will cause the body to convert glycogen into glucose.

13. Nov/2022/Paper_22/No.25

Which hormone causes an increase in breathing rate, an increase in heart rate and the widening of pupils?

A insulin

B adrenaline

C oestrogen

D testosterone

14. Nov/2022/Paper_22/No.26

Which row about tropic responses is correct?

	gravitropism	phototropism
A	root grows away from gravity	shoot grows away from light source
B	root grows away from gravity	shoot grows towards light source
C	root grows towards gravity	shoot grows away from light source
D	root grows towards gravity	shoot grows towards light source

15. Nov/2022/Paper_23/No.24

What is a response to a low concentration of glucose in the blood?

A Glucagon will cause the body to convert glucose into glycogen.

B Glucagon will cause the body to convert glycogen into glucose.

C Insulin will cause the body to convert glucose into glycogen.

D Insulin will cause the body to convert glycogen into glucose.

16. Nov/2022/Paper_23/No.25

Which endocrine gland secretes insulin?

A adrenal

B ovary

C pancreas

D testis

17. Nov/2022/Paper_23/No.26

Which factors affect the growth of plants?

A gravity and light only

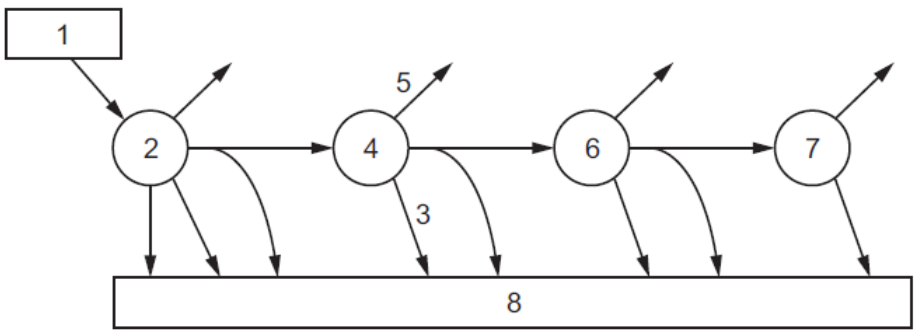
B gravity, light and temperature

C gravity and temperature only

D light and temperature only

18. Nov/2022/Paper_23/No.31

The diagram shows the flow of energy through a food chain.



Which row correctly labels this energy flow diagram?

	chemical energy in producers	chemical energy in decomposers	energy loss by respiration	energy loss by excretion	chemical energy in tertiary consumers
A	2	8	5	3	7
B	1	7	5	3	6
C	2	8	3	5	7
D	1	7	3	5	6

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19. Nov/2022/Paper_32/No.9

(a) Fig. 9.1 contains some information about a reflex action.

A person touches a hot pan. **Electrical impulses travel to the central nervous system which coordinates a response.** **The muscles in the arm contract quickly.**

Fig. 9.1

(i) State the name of the stimulus from the example given in Fig. 9.1.

..... [1]

(ii) State the name of the effector from the example given in Fig. 9.1.

..... [1]

(iii) State the names of the **two** parts of the central nervous system.

1 .....

2 .....

[2]

(b) Fig. 9.2 shows diagrams of three types of neurones.

State the names of the three types of neurones on the lines provided in Fig. 9.2.



....

not to scale

Fig. 9.2

[3]

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20. Nov/2022/Paper_33/No.(9a_ b)

(a) Complete the description of the endocrine system, using words from the list.

Each word or phrase may be used once, more than once or not at all.

adrenal glands	**blood**	**chemical**	**decreases**	**electrical**
	increases	**narrows**	**nerves**	
oestrogen	**ovaries**	**testes**	**testosterone**	**widens**

Hormones are ..... substances that are produced by glands and carried by the ..... . A hormone alters the activity of a target organ.

An example of a hormone is adrenaline, which is produced in the ..... . Adrenaline ..... the breathing rate, ... the pulse rate and ..... the pupils.

[6]

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(b) Fig. 9.1 is a diagram of some human organs.

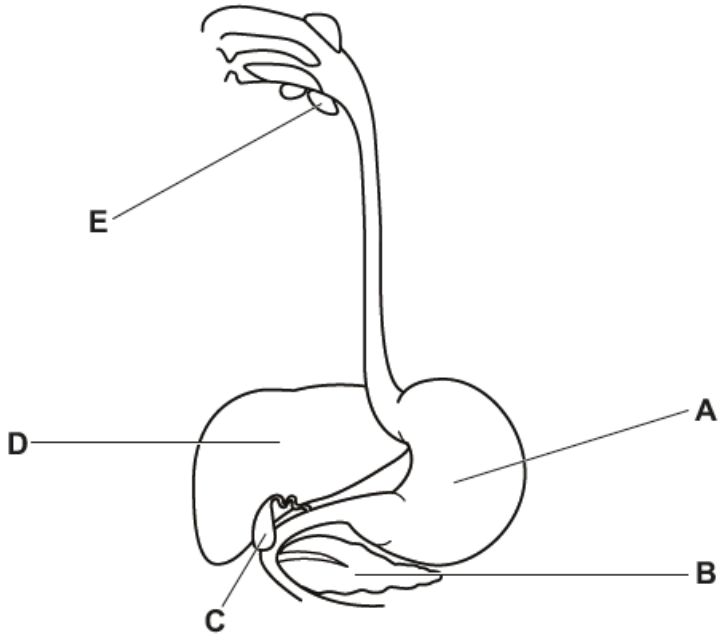


Fig. 9.1

(i) State the letter in Fig. 9.1 that identifies the organ that produces insulin.

..... [1]

(ii) State the function of insulin.

.....

.....

..... [1]

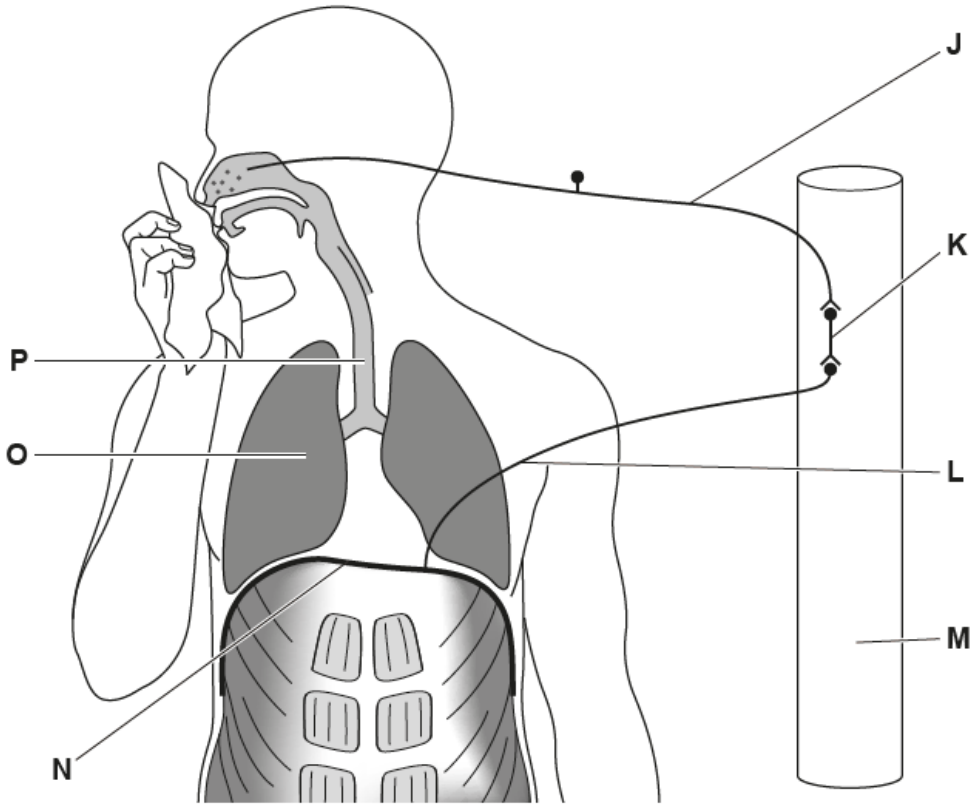
(iii) State the letter in Fig. 9.1 that identifies the organ that produces urea.

..... [1]

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21. Nov/2022/Paper_43/No.1

(a) Fig. 1.1 is a diagram showing parts of two organ systems that are active when a person sneezes.



view of part of the gas exchange system view of part of the nervous system

not to scale

Fig. 1.1

(i) Sneezing is an automatic action that occurs in response to a stimulus in the nose.

State the name of this type of automatic action.

..... [1]

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(ii) Table 1.1 shows the names and functions of some of the parts of the human body that are involved when a person sneezes, and the letters in Fig. 1.1 that identify these parts.

Complete Table 1.1.

Table 1.1

function	name of structure	letter in Fig. 1.1
cell that transmits an impulse from the receptor to the central nervous system		
	diaphragm	
		M
		K
contains cilia to move mucus out of the airway		

[5]

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(b) Fig. 1.2 is a diagram of a cell from the human nervous system.

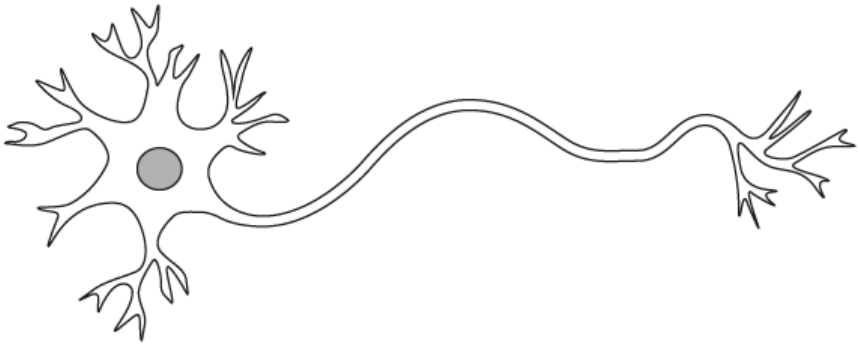


Fig. 1.2

(i) On Fig. 1.2, label **two** visible cell structures. [2]

(ii) Draw an **X** on the cell in Fig. 1.2 to show where a receptor molecule for a neurotransmitter would be found. [1]

(iii) Explain how the cell in Fig. 1.2 is adapted for transmitting impulses.

.....

.....

.....

.....

..... [2]

(c) Describe how nervous communication differs from hormonal communication.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 14]

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Coordination and response – 2022 June IGCSE 0610

1. June/2022/Paper_ 11/No.26

Which hormone triggers the 'fight or flight' response?

A testosterone

B oestrogen

C adrenaline

D insulin

2. June/2022/Paper_ 11/No.27

Which organ detects and coordinates the response to changes in internal body temperature?

A brain

B heart

C liver

D skin

3. June/2022/Paper_ 11/No.28

Which statement describes the plant response known as phototropism?

A All parts of a plant grow towards light.

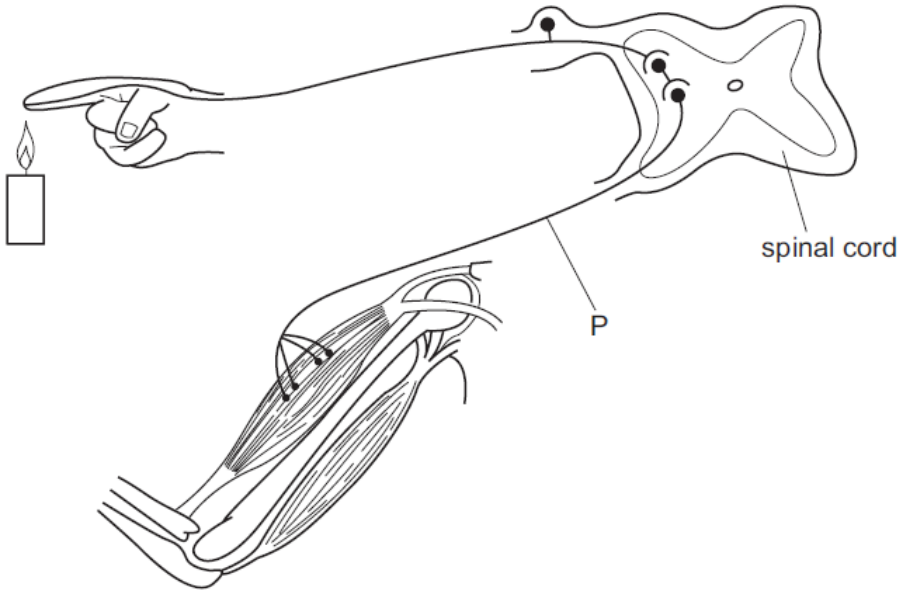
B All parts of a plant grow away from light.

C Plant shoots grow towards light.

D Plant roots grow towards light.

4. June/2022/Paper_ 12/No.26

The diagram shows a simple reflex arc.



What is the function of the part labelled P?

A passing impulses to the central nervous system

B passing impulses to the effector

C passing impulses to the receptor

D passing impulses to the sensory neurone

5. June/2022/Paper_ 12/No.27

Which endocrine gland produces insulin?

A adrenal gland

B ovary

C pancreas

D testes

6. June/2022/Paper_ 12/No.28

Where in the body are the blood temperature receptors?

A brain

B liver

C muscles

D skin

7.

8. June/2022/Paper_ 13/No.28

Which part of the eye focuses light on the retina?

A cornea

B pupil

C iris

D lens

9. June/2022/Paper_ 13/No.29

Which statement about the hormone insulin is correct?

A It is produced by the liver and raises blood sugar concentration.

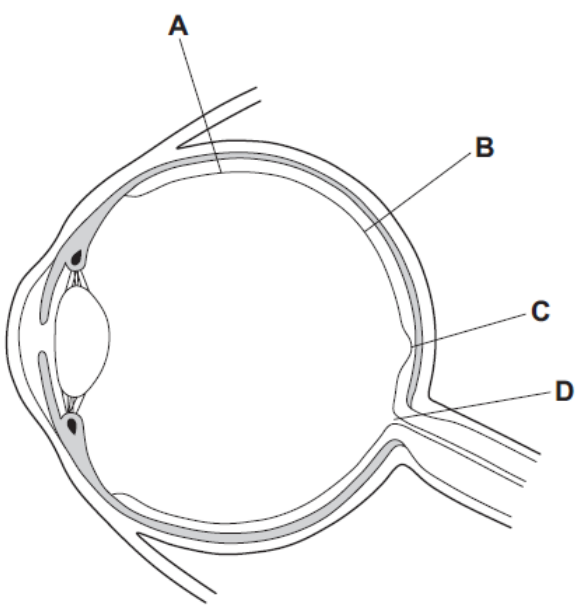
B It is produced by the liver and lowers blood sugar concentration.

C It is produced by the pancreas and raises blood sugar concentration.

D It is produced by the pancreas and lowers blood sugar concentration.

10. June/2022/Paper_ 21/No.24

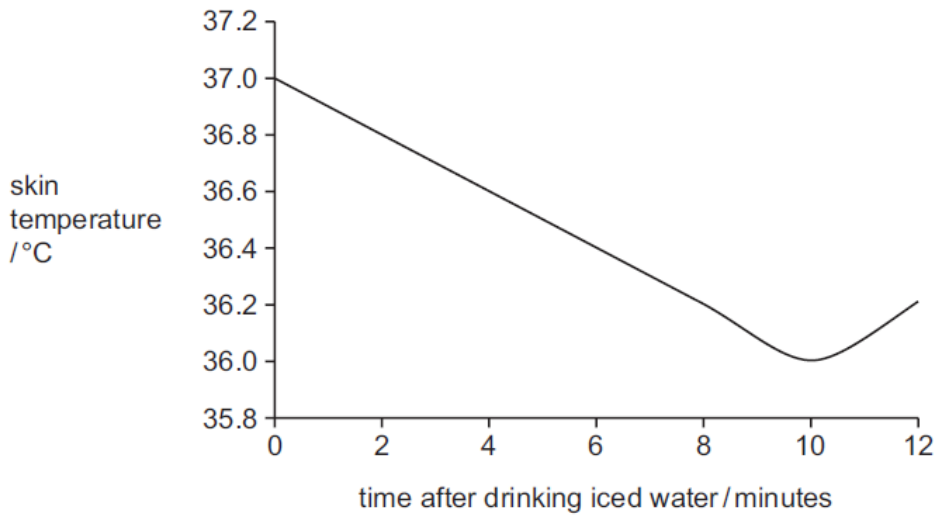
Where in the eye is the greatest concentration of cells that allow humans to see colour?



11. June/2022/Paper_ 21/No.25

A scientist investigated the effect of drinking iced water on skin temperature. They drank a large volume of iced water and monitored the temperature of their skin.

The results are shown on the graph.



Which explanation of the change in skin temperature during the first 10 minutes is correct?

A Vasoconstriction occurred increasing blood flow to the skin.

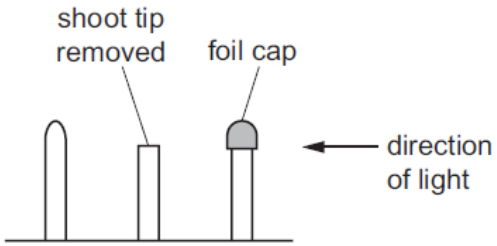
B Vasoconstriction occurred reducing blood flow to the skin.

C Vasodilation occurred increasing blood flow to the skin.

D Vasodilation occurred reducing blood flow to the skin.

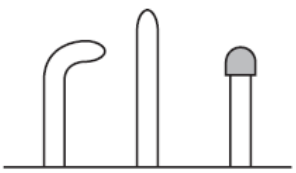
12. June/2022/Paper_ 21/No.26

An experiment was set up to investigate the growth of shoots in different conditions, as shown.

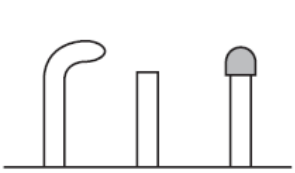


Which diagram shows the results that would be seen a few days later?

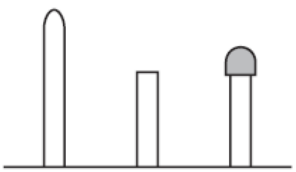
A



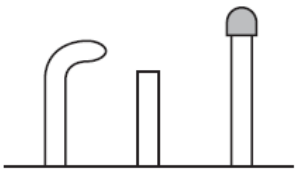
B



C

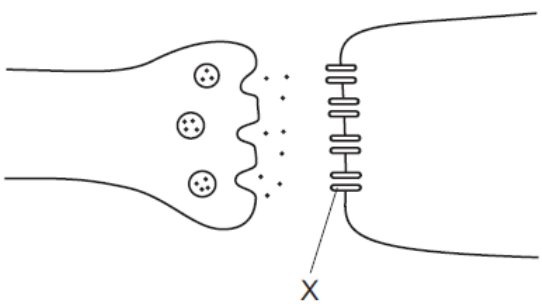


D



13. June/2022/Paper_ 23/No.24

The diagram shows the junction between two neurones.



What is labelled at X?

A neurotransmitter

B vesicle

C neurotransmitter receptor molecule

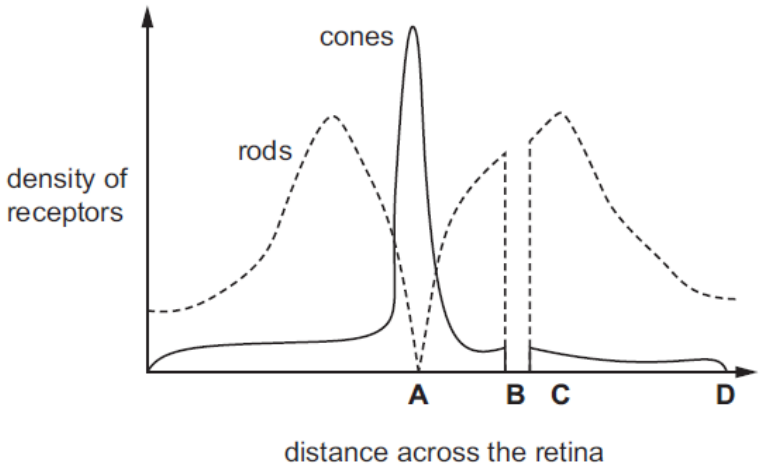
D synaptic cleft

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14. June/2022/Paper_ 23/No.25

The diagram shows the density of rods and cones across a section of the retina.

What is the position of the fovea?



15. June/2022/Paper_ 23/No.26

What is the synthetic plant hormone 2,4-D used for?

A genetic engineering

B inhibiting phototropism

C killing weeds

D promoting germination

16. June/2022/Paper_ 32/No.2(a_ d)

(a) Define the term homeostasis.

.....

.....

.....

.....

..... [2]

(b) The box on the left shows the beginning of a sentence.

The boxes on the right show some sentence endings.

Draw **three** straight lines to make three correct sentences about the brain.

	and spinal cord are part of the peripheral nervous system.
	coordinates body functions.
	contains receptors that detect the temperature of the blood.
The brain	
	produces insulin.
	receives impulses from motor neurones.
	receives impulses from the optic nerve.

[3]

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(c) Fig. 2.1 shows part of a cross-section of mammalian skin.

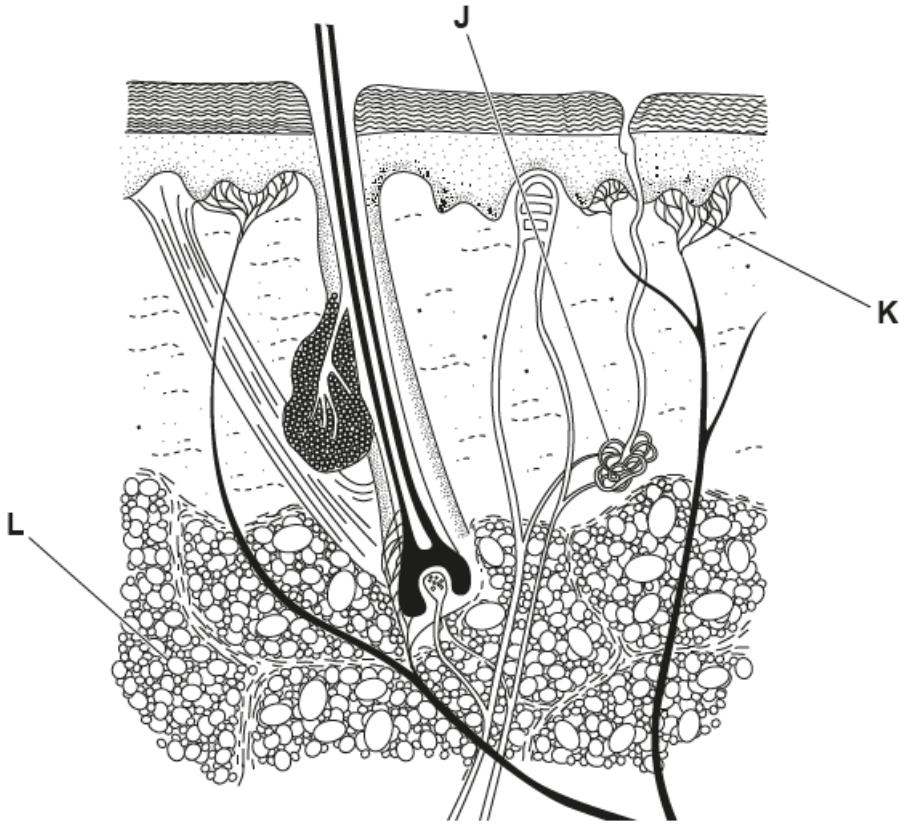


Fig. 2.1

State the names of **J**, **K** and **L** in Fig. 2.1.

J .....

K .....

L .....

[3]

(d) Describe how structures in the body help to keep the body warm in a cool environment.

.....

.....

.....

.....

.....

.....

..... [3]

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17. June/2022/Paper_ 32/No.7(a_ d)

(a) A student investigated plant growth responses.

A seedling was attached to a support stand and placed under a lamp.

(i) Complete Fig. 7.1 by drawing the expected position of the root **and** shoot after seven days of growth.

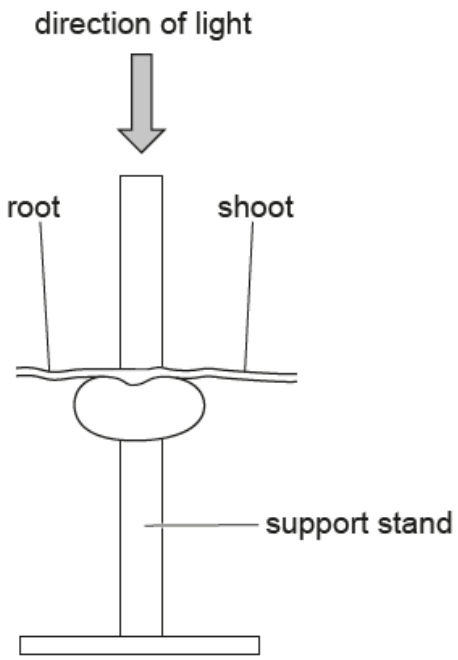


Fig. 7.1

[2]

(ii) State the type of growth response plants show in response to the direction of light.

..... [1]

(iii) State the type of nuclear division that is used for growth.

..... [1]

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(b) Seeds need certain factors for germination.

Circle **three** factors that are needed for germination.

carbon dioxide	**iron**	**nitrogen**	**oxygen**
suitable temperature	**water**	**vitamin C**	

[3]

(c) Complete the sentences.

Seeds contain proteins for the ..... of developing shoots and roots. Proteins contain the elements ..... , oxygen, ... and nitrogen.

The new leaves of a seedling need the mineral ion ..... to make the green pigment ..... .

This green pigment is needed to carry out the process of ....., in the presence of light.

[6]

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18. June/2022/Paper_ 33/No.9(a_ c)

(b) Fig. 9.1 is a diagram of a section of a human eye.

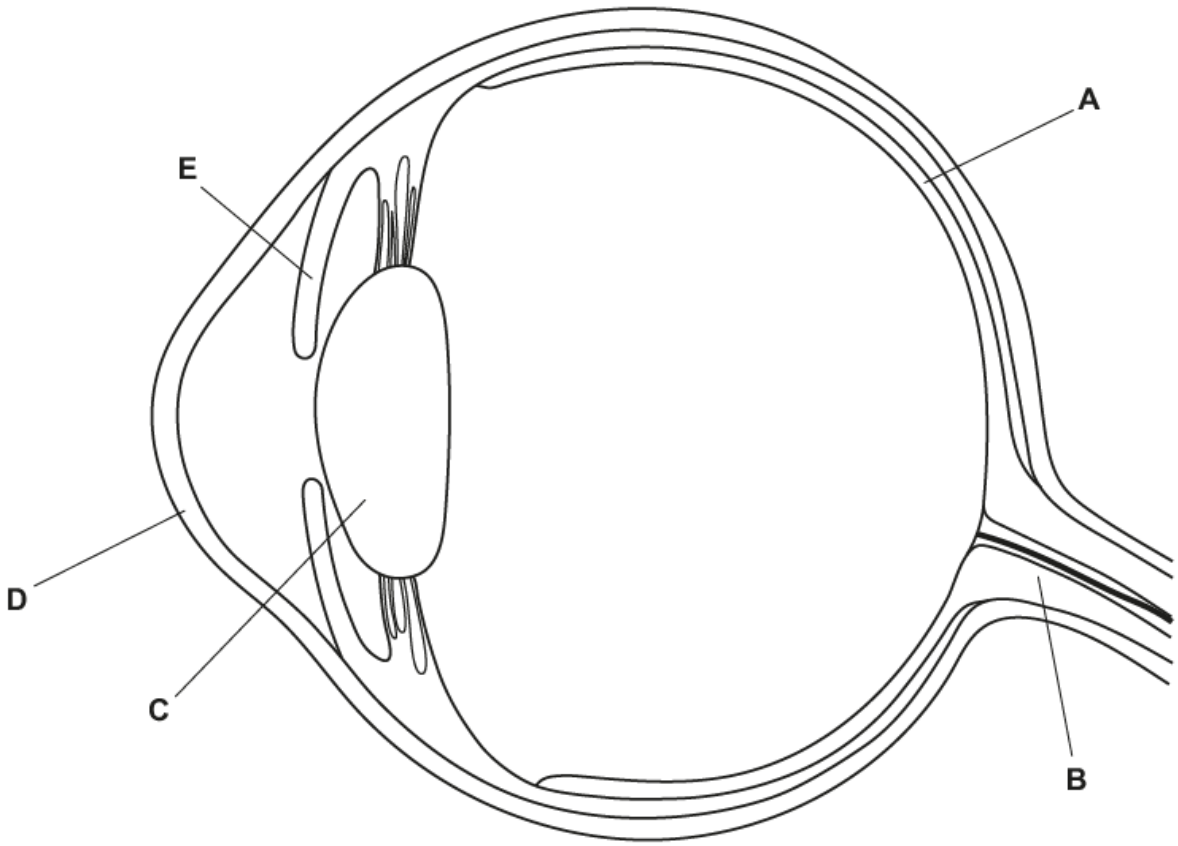


Fig. 9.1

State the letter of the structure shown on Fig. 9.1 that:

- focuses light on the light receptors .....
- refracts light .....
- controls how much light enters the pupil .....
- carries impulses to the brain .....

[4]

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(c) Fig. 9.2 is a diagram of an eye in a dark room and in a light room.

Draw the expected size of the pupil on the eye in the **light room** in Fig. 9.2.

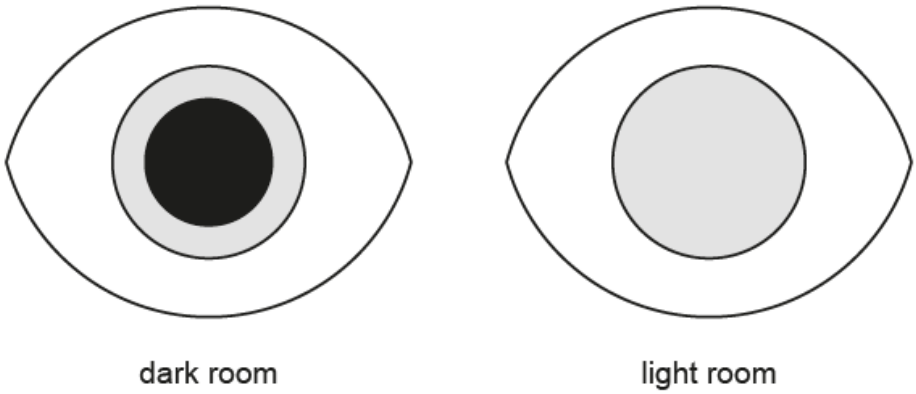


Fig. 9.2

[1]

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19. June/2022/Paper_ 42/No.3(a_ b)

The eye is adapted for focusing on near and distant objects.

Fig. 3.1 shows the parts of the eye involved in focusing. The eye is focused on a distant object.

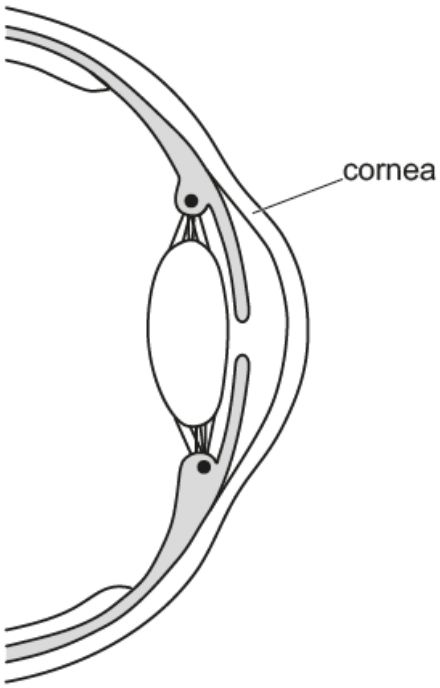


Fig. 3.1

(a) **(i)** State the term used to describe what happens to light as it passes from the air into the cornea.

..... [1]

(ii) Describe **and** explain the changes that occur in the eye when adjusting focus from a **distant** object to a **near** object.

.....

.....

.....

.....

.....

.....

..... [3]

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(b) Rods and cones are the receptors in the retina of the eye.

(i) Describe the functions of rods and cones in the eye.

.....

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.....

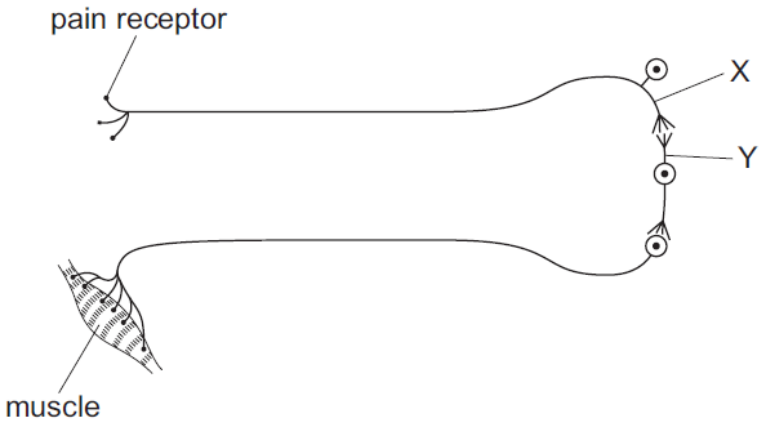
..... [4]

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Coordination and response – 2021 IGCSE 0610

1. Nov/2021/Paper_11/No.26

The diagram shows a reflex arc that passes through the spinal cord.

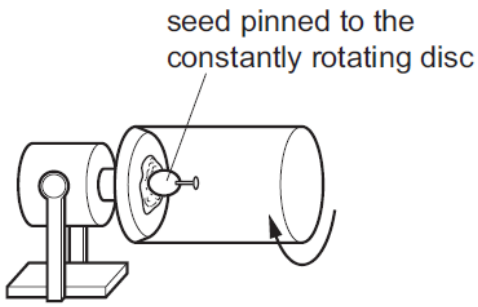


Which type of neurones are X and Y?

	X	Y
A	motor neurone	relay neurone
B	relay neurone	sensory neurone
C	sensory neurone	motor neurone
D	sensory neurone	relay neurone

2. Nov/2021/Paper_11/No.28

A seed is placed and grown on a rotating disc, as shown.



Which diagram shows the appearance of the seedling shoot after seven days?

A **B** **C** **D**



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3. Nov/2021/Paper_12/No.26

The structures listed are part of the nervous system.

1 brain

2 effector

3 receptor

4 relay neurone

In a reflex arc, which structures are connected to a motor neurone by synapses?

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

4. Nov/2021/Paper_12/No.27

A student investigated the effect of changing light intensity on pupil diameter in the eye.

The table shows the results.

starting pupil diameter / mm	final pupil diameter / mm
8	2

Which explanation for the student's results is correct?

A A reduced light intensity reduced the pupil diameter by 75%.

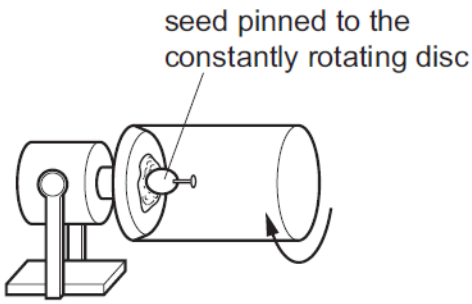
B A reduced light intensity reduced the pupil diameter by 25%.

C An increased light intensity reduced the pupil diameter by 75%.

D An increased light intensity reduced the pupil diameter by 25%.

5. Nov/2021/Paper_12/No.28

A seed is placed and grown on a rotating disc, as shown.



Which diagram shows the appearance of the seedling shoot after seven days?



6. Nov/2021/Paper_13/No.26

Which part of the eye changes in size in response to changes in light intensity?

A cornea

B lens

C pupil

D retina

7. Nov/2021/Paper_13/No.27

A scientist investigated how the human body reacts to temperature.

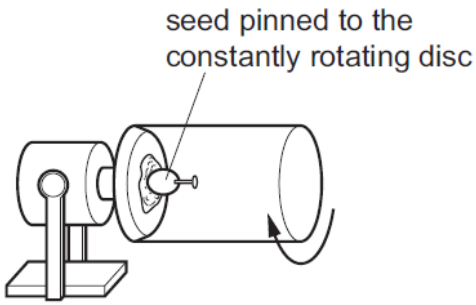
Which row shows the expected responses when the environmental temperatures are 0 °C and 40 °C?

	0 °C	40 °C
A	sweating	no response
B	sweating	shivering
C	no response	sweating
D	shivering	sweating

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8. Nov/2021/Paper_13/No.28

A seed is placed and grown on a rotating disc, as shown.



Which diagram shows the appearance of the seedling shoot after seven days?



9. Nov/2021/Paper_21/No.24

Which situation is a voluntary action?

A an increase in heart rate in response to danger

B blinking to avoid injury to the eye

C raising your hand to answer a question

D sweating in hot weather

10. Nov/2021/Paper_21/No.26

How does the body increase blood glucose concentration?

A Insulin released by the liver triggers the pancreas to release glucose.

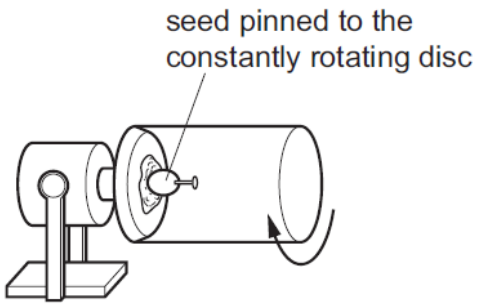
B Glucagon released by the pancreas triggers the liver to release glucose.

C Insulin released by the pancreas triggers the liver to release glucose.

D Glucagon released by the liver triggers the pancreas to release glucose.

11. Nov/2021/Paper_21/No.28

A seed is placed and grown on a rotating disc, as shown.



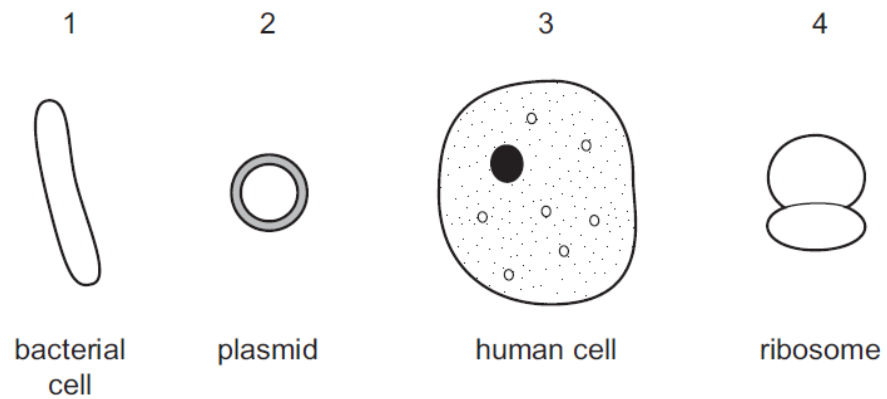
Which diagram shows the appearance of the seedling shoot after seven days?



12. Nov/2021/Paper_21/No.38

Human insulin is a protein that can be made by genetically engineered bacteria. This involves the transfer of genetic information to bacteria.

The diagrams show cells and parts of cells involved in this process.



13. Nov/2021/Paper_22/No.25

The structures listed are part of the nervous system.

1 brain

2 effector

3 receptor

4 relay neurone

In a reflex arc, which structures are connected to a motor neurone by synapses?

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

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14. Nov/2021/Paper_22/No.26

Which process is a response of the body that is part of a negative feedback process?

A release of insulin in response to low blood glucose concentration

B vasoconstriction in response to an increase in blood temperature

C synthesis of glycogen in response to increase in blood glucose concentration

D sweating in response to a decrease in blood temperature

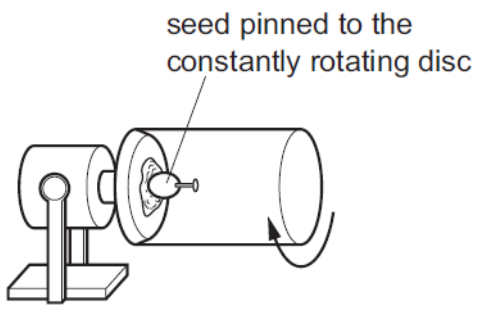
15. Nov/2021/Paper_22/No.27

Which row shows the pupil reflex in bright light?

	muscles in iris		size of pupil
	circular	radial	
A	contracts	relaxes	larger
B	contracts	relaxes	smaller
C	relaxes	contracts	larger
D	relaxes	contracts	smaller

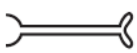
16. Nov/2021/Paper_22/No.28

A seed is placed and grown on a rotating disc, as shown.



Which diagram shows the appearance of the seedling shoot after seven days?

A



B



C



D



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17. Nov/2021/Paper_23/No.25

What happens to the muscles in the iris when a person moves from a brightly lit room to a dimly lit room?

A The circular muscles and the radial muscles relax.

B The circular muscles contract and the radial muscles relax.

C The circular muscles and the radial muscles contract.

D The circular muscles relax and the radial muscles contract.

18. Nov/2021/Paper_23/No.26

What happens when someone has a low blood glucose concentration?

A Insulin is released from the pancreas.

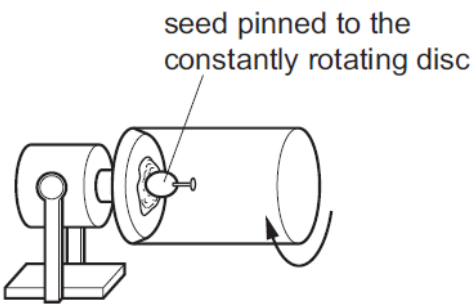
B Glycogen is released from the pancreas.

C Glucagon is released from the liver.

D Glucose is released from the liver.

19. Nov/2021/Paper_23/No.28

A seed is placed and grown on a rotating disc, as shown.



Which diagram shows the appearance of the seedling shoot after seven days?

A



B



C



D



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20. Nov/2021/Paper_32/No.1

(a) Fig. 1.1 is a diagram of the parts of the eye.

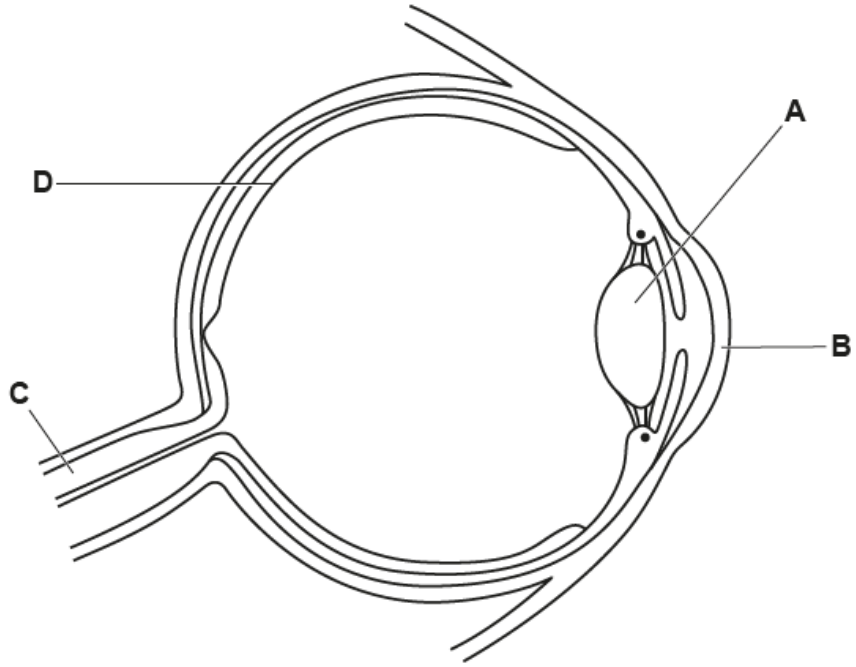


Fig. 1.1

(i) The boxes on the left show the letters of the parts of the eye in Fig. 1.1.

The boxes on the right show some functions of parts of the eye.

Draw lines to link the letter of the part from Fig. 1.1 to its function.

letter in Fig. 1.1	**function**
A	carries impulses to the brain
B	contains light receptors
C	focusses light onto the retina
D	refracts light as it enters the eye

[3]

(ii) Draw an **X on Fig. 1.1** to show the position of the blind spot. [1]

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(b) Fig. 1.2 shows the change that occurs in the eye after it is exposed to bright light.



before exposure after exposure

Fig. 1.2

Describe the change to the eye in Fig. 1.2 **and** explain why this change is important.

.....

.....

.....

.....

.....

.....

..... [3]

(c) The eye is a sense organ.

The skin is another type of sense organ.

State **two** stimuli that skin responds to.

1 .....

2 .....

[2]

[Total: 9]

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21. Nov/2021/Paper_42/No.4

Involuntary actions occur because nerve impulses travel along the components of reflex arcs.

An example of an involuntary action is the rapid movement of a hand after unexpectedly touching a very hot object.

Fig. 4.1 shows the structures that are involved in the movement of the hand.

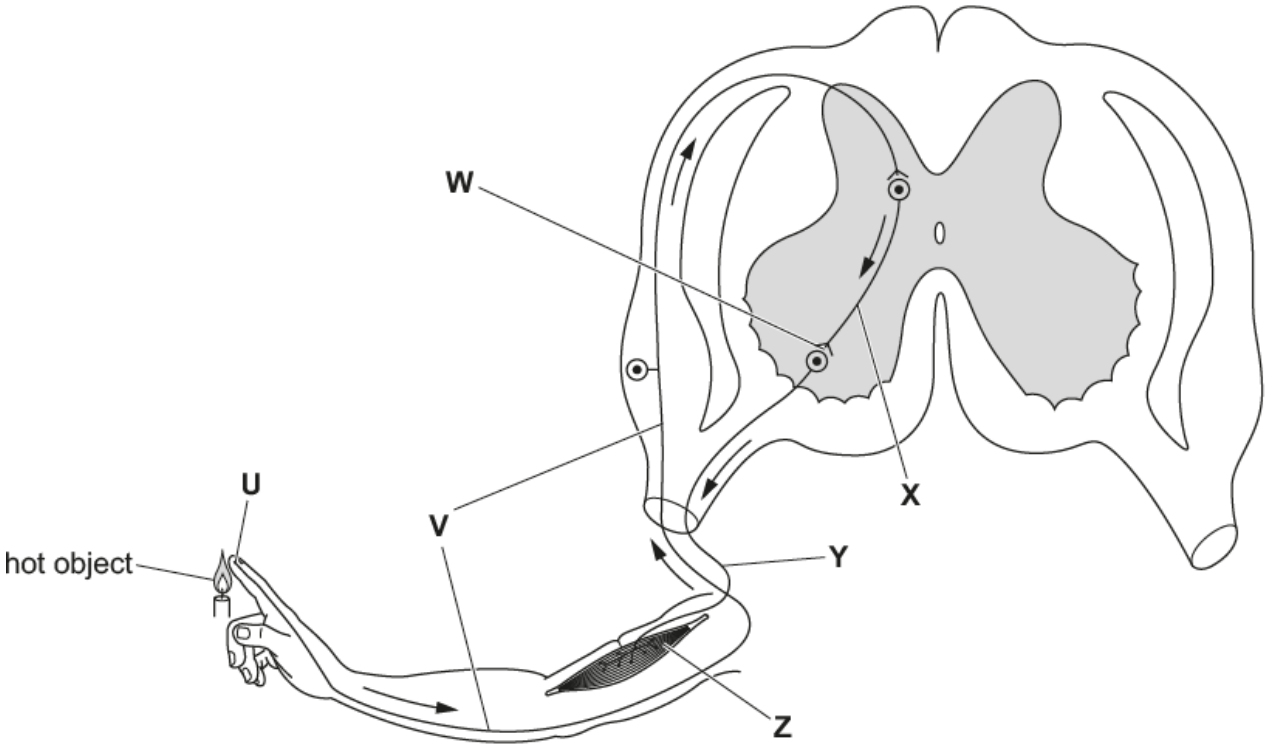


Fig. 4.1

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(a) Table 4.1 shows the functions of some of the structures shown in Fig. 4.1, the names of the structures and the letter from Fig. 4.1 that identifies each structure.

Complete Table 4.1.

Table 4.1

function	name	letter on Fig. 4.1
conducts impulses to central nervous system (CNS)		
conducts impulses to an effector		
conducts impulses only within the CNS		
	receptor	
		Z

[5]

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(b) Fig. 4.2 shows the structure of the synapse at **W** on Fig. 4.1.

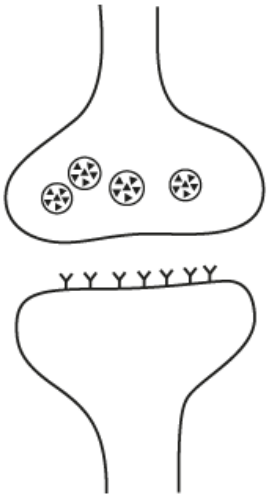


Fig. 4.2

Describe how an impulse travels across the synapse shown in Fig. 4.2.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(c) State **one** example of a reflex action that occurs in the eye.

.....

.....

..... [1]

[Total: 10]

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Coordination and response – 2021 IGCSE 0610

1. March/2021/Paper_12/No.25

Sensory neurones conduct impulses from

A the brain and spinal cord to muscles.

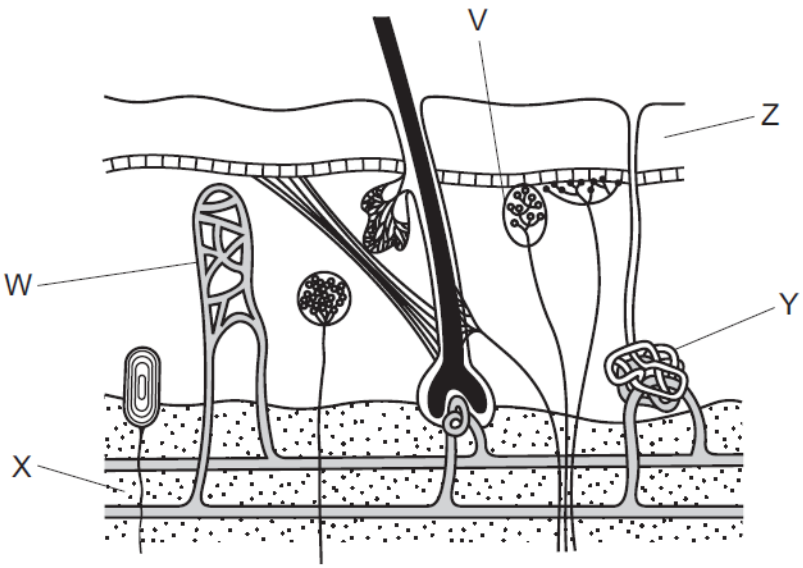
B one sense organ to another sense organ.

C sense organs to the brain and spinal cord.

D sense organs to muscles.

2. March/2021/Paper_12/No.26

The diagram shows a section through human skin.



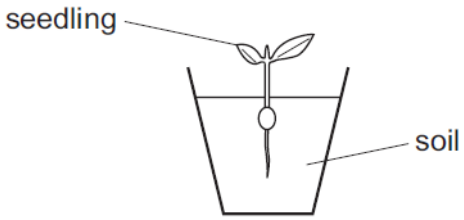
Which row matches the labelled part to its function?

	insulation	sensing temperature	sweat production
A	Y	W	Z
B	Y	V	X
C	X	W	Z
D	X	V	Y

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3. March/2021/Paper_12/No.27

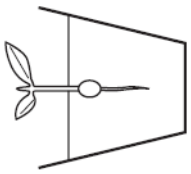
The diagram shows a seedling growing in a pot in the light.



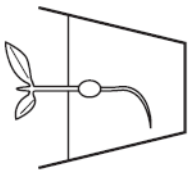
The pot was then placed on its side in a dark room.

What will be the appearance of the seedling after 48 hours?

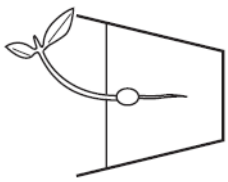
A



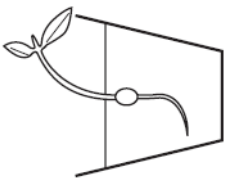
B



C



D



4. March/2021/Paper_22/No.25

What is a function of a synapse?

A to allow impulses to travel in both directions

B to ensure impulses travel in one direction

C to release vesicles into the synaptic gap

D to transport neurotransmitters by osmosis

5. June/2021/Paper_11/No.26

What is the sequence of neurones connecting a receptor to an effector in a reflex arc?

A motor → relay → sensory

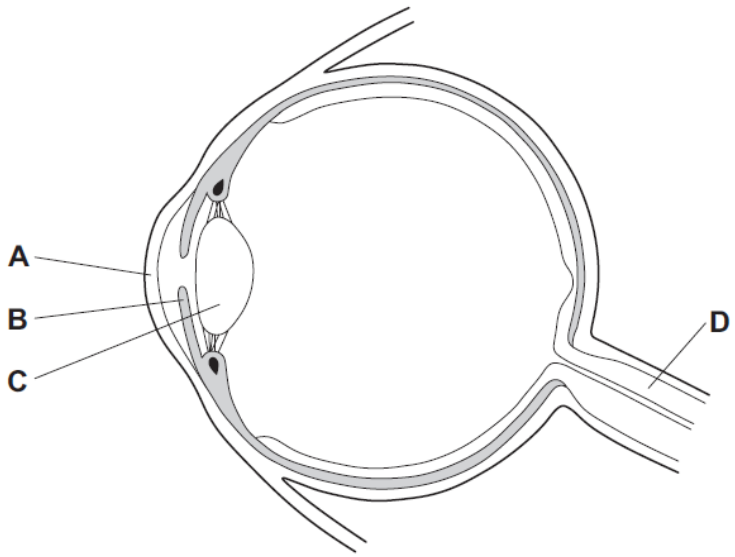
B motor → sensory → relay

C sensory → motor → relay

D sensory → relay → motor

6. June/2021/Paper_11/No.27

What controls how much light enters the eye?



7. June/2021/Paper_11/No.28

Which row matches each hormone to its function?

	causes the growth of facial hair	reduces blood glucose concentration	repairs the lining of the uterus	widens the pupils
A	oestrogen	insulin	testosterone	adrenaline
B	oestrogen	insulin	insulin	testosterone
C	testosterone	adrenaline	insulin	oestrogen
D	testosterone	insulin	oestrogen	adrenaline

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8. June/2021/Paper_12/No.23

What is the link between muscle contraction, protein synthesis and the maintenance of a constant body temperature?

A They are controlled by hormones.

B They are examples of homeostasis.

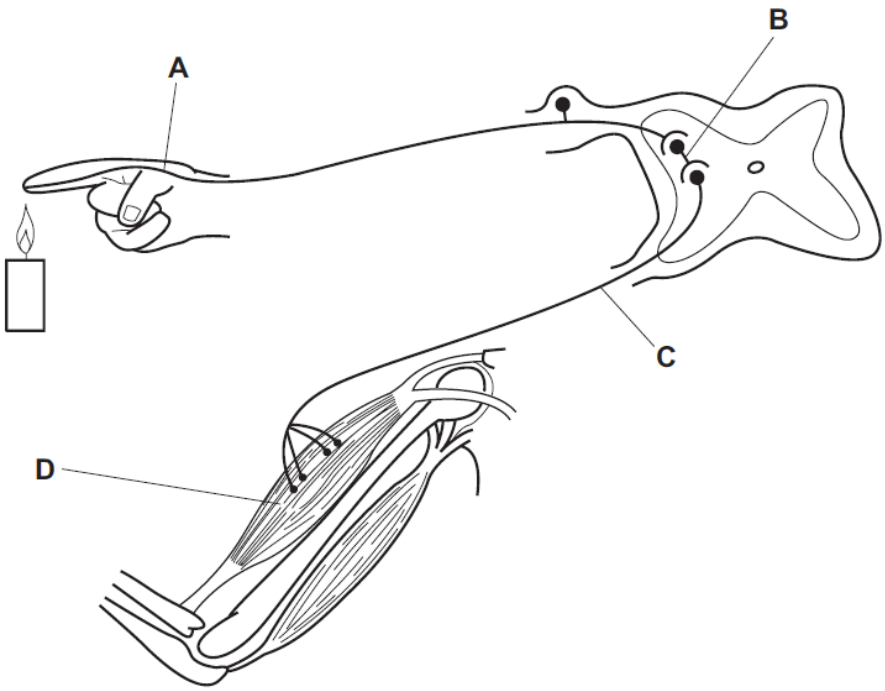
C They require energy.

D They require carbon dioxide.

9. June/2021/Paper_12/No.26

The diagram shows a reflex arc.

Which labelled part is the effector?



10. June/2021/Paper_12/No.27

A person's iris is damaged.

What is the effect of this?

A Nerve impulses from the eye cannot reach the brain.

B The person cannot control how much light enters the eye.

C The person cannot focus light onto the retina.

D Receptors do not produce nerve impulses in response to light.

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11. June/2021/Paper_12/No.28

Which hormone is secreted by the pancreas?

A adrenaline

B insulin

C oestrogen

D testosterone

12. June/2021/Paper_13/No.26

A student's eyes blinked as a ball flew past their head. This is a reflex action.

Which row describes the reaction shown by the student?

A a fast reaction involving the endocrine system

B a fast reaction involving the nervous system

C a slow reaction involving the endocrine system

D a slow reaction involving the nervous system

13. June/2021/Paper_13/No.27

What type of cell must an organ contain to detect a stimulus?

A blood

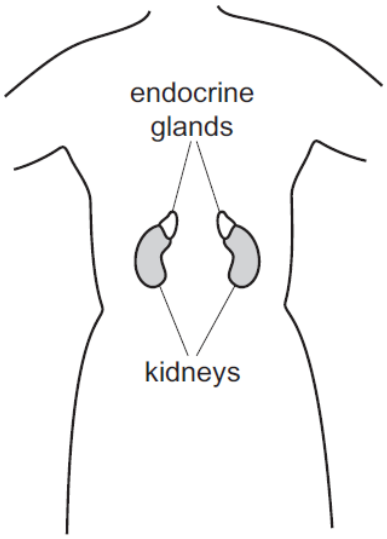
B receptor

C skin

D xylem

14. June/2021/Paper_13/No.28

The diagram shows the position of the kidneys in a human. Each kidney has an endocrine gland above it.



Which glands are shown?

A adrenal glands

B ovaries

C pancreas

D testes

15. June/2021/Paper_13/No.32

Changes occur in a boy's body at puberty; his height increases, more muscle develops and body hair grows.

Which hormone stimulates these changes?

A adrenaline

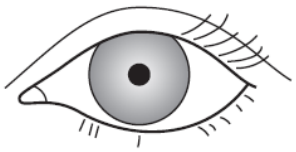
B insulin

C oestrogen

D testosterone

16. June/2021/Paper_21/No.26

The diagram shows the appearance of an eye when in bright light.



bright light

Which row gives the correct states of the iris muscles in bright light?

	radial muscles	circular muscles
A	contracted	contracted
B	contracted	relaxed
C	relaxed	contracted
D	relaxed	relaxed

17. June/2021/Paper_21/No.27

What is the effect of adrenaline on pulse rate and blood glucose concentration?

	pulse rate	blood glucose
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

18. June/2021/Paper_21/No.28

Which statements about auxin are correct?

1 Auxin is made in all cells in plants.

2 Auxin causes cells to elongate.

3 Auxin moves between the cells by osmosis.

4 Auxin is unequally distributed.

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

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19. June/2021/Paper_22/No.23

What is the link between muscle contraction, protein synthesis and the maintenance of a constant body temperature?

A They are controlled by hormones.

B They are examples of homeostasis.

C They require energy.

D They require carbon dioxide.

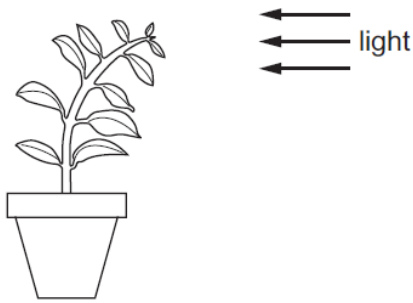
20. June/2021/Paper_22/No.26

What is the result of the release of adrenaline?

	blood glucose concentration	breathing rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

21. June/2021/Paper_22/No.28

The diagram shows a plant next to a window.



Which statement explains the plant shoot's growth?

A There is a higher concentration of auxin in the cells on the shaded side of the shoot. This prevents cell elongation.

B There is a higher concentration of auxin in the cells on the shaded side of the shoot. This stimulates cell elongation.

C There is a lower concentration of auxin in the cells on the shaded side of the shoot. This prevents cell elongation.

D There is a lower concentration of auxin in the cells on the shaded side of the shoot. This stimulates cell elongation.

22. June/2021/Paper_23/No.26

Which row shows the levels of organisation for structures associated with the eye?

	cell	tissue	organ	organ system
A	cone	fovea	endocrine	eye
B	rod	retina	eye	nervous
C	antibody	muscle	artery	circulatory
D	lymphocyte	capillary	vein	sensory

23. June/2021/Paper_23/No.27

Which row correctly compares hormonal control with nervous control?

	speed of action of hormonal control	how long the effects of the hormone lasts
A	rapid	short
B	slow	long
C	rapid	long
D	slow	short

24. June/2021/Paper_23/No.28

Which statement about the regulation of human body temperature is correct?

A Vasoconstriction of skin arterioles occurs when the body temperature is too low.

B Vasodilation of skin arterioles occurs when the body temperature is too low.

C Vasoconstriction of skin capillaries occurs when the body temperature is too high.

D Vasodilation of skin capillaries occurs when the body temperature is too low.

25. June/2021/Paper_23/No.29

Why are people advised **not** to drive a car after drinking an excessive quantity of alcohol?

A Alcohol is a depressant.

B Alcohol is a stimulant.

C Alcohol decreases reaction time.

D Alcohol is addictive.

26. June/2021/Paper_33/No.4

Fig. 4.1 shows part of the human nervous system.

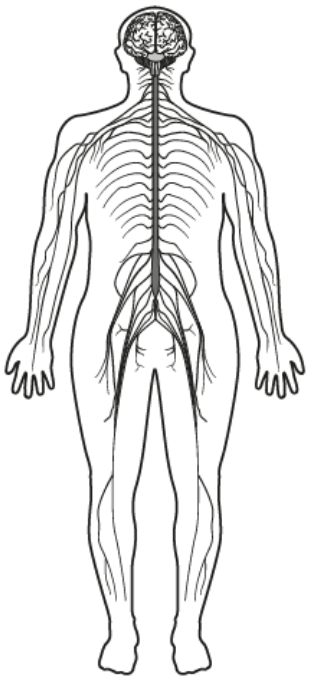


Fig. 4.1

(a) (i) State the **two** parts of the central nervous system.

1 .....

2 .....
[2]

(ii) Describe the main function of the nervous system.

.....

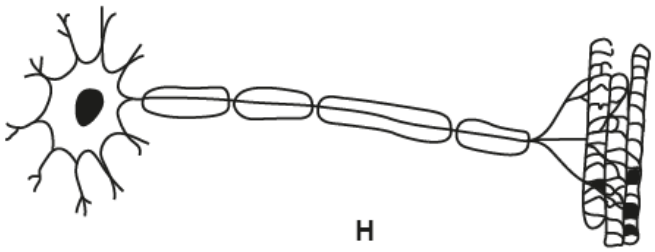
.....

..... [1]

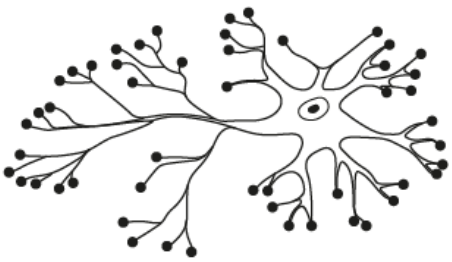
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(b) Fig. 4.2 shows three different types of neurone.

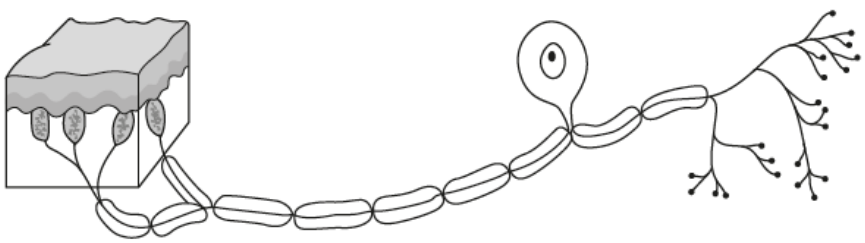
These cells are used in some reflex actions.



H



J



K

not to scale

Fig. 4.2

(i) State the names of cells **H** and **K** in Fig. 4.2.

H .....

K .....

[2]

(ii) Describe **one** feature of a reflex action.

.....

.....

..... [1]

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27. June/2021/Paper_41/No.4

Two identical potted plants were used to investigate plant responses.

Plant **A** was placed on a clinostat that continually rotated. Plant **B** was not rotated.

Both plants were then placed on their sides and kept in the dark.

Fig. 4.1 shows the two plants at the start of the experiment and after seven days.

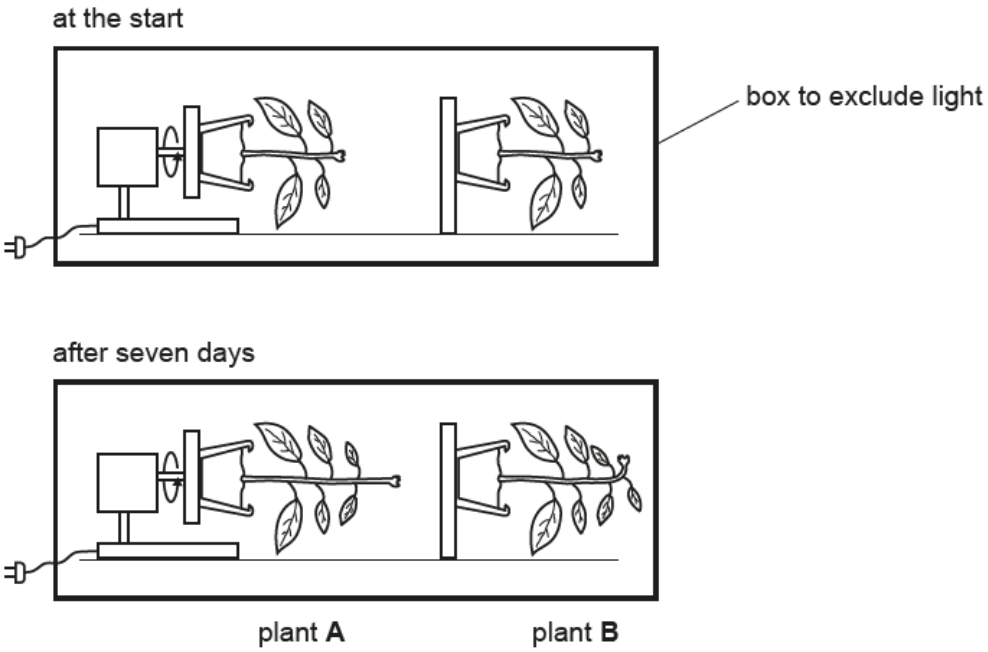


Fig. 4.1

(a) State the name of the response shown by the shoot of plant **B**.

..... [1]

(b) Explain the reason for constantly rotating plant **A**.

.....

.....

.....

.....

..... [2]

(c) **(i)** State the name of the plant hormone that causes the response of the shoot of plant **B**.

..... [1]

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(ii) Explain how the plant hormone causes the response of plant **B**.

.....

.....

.....

.....

.....

.....

..... [3]

(d) Seeds germinate in the soil. The seedlings that grow from seeds show the same response as shown by plant **B** in Fig. 4.1.

Explain the advantages of this response to the survival of seedlings and mature plants.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 10]

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(a) Complete the sentence about the nervous system.

The brain and spinal cord form the ..... nervous system and the nerves coming into and out of the spinal cord are part of the ..... nervous system. [1]

(b) Fig. 1.1 shows part of a human eye and three neurones that conduct electrical impulses between the eye and the brain. These neurones are involved in the pupil reflex.

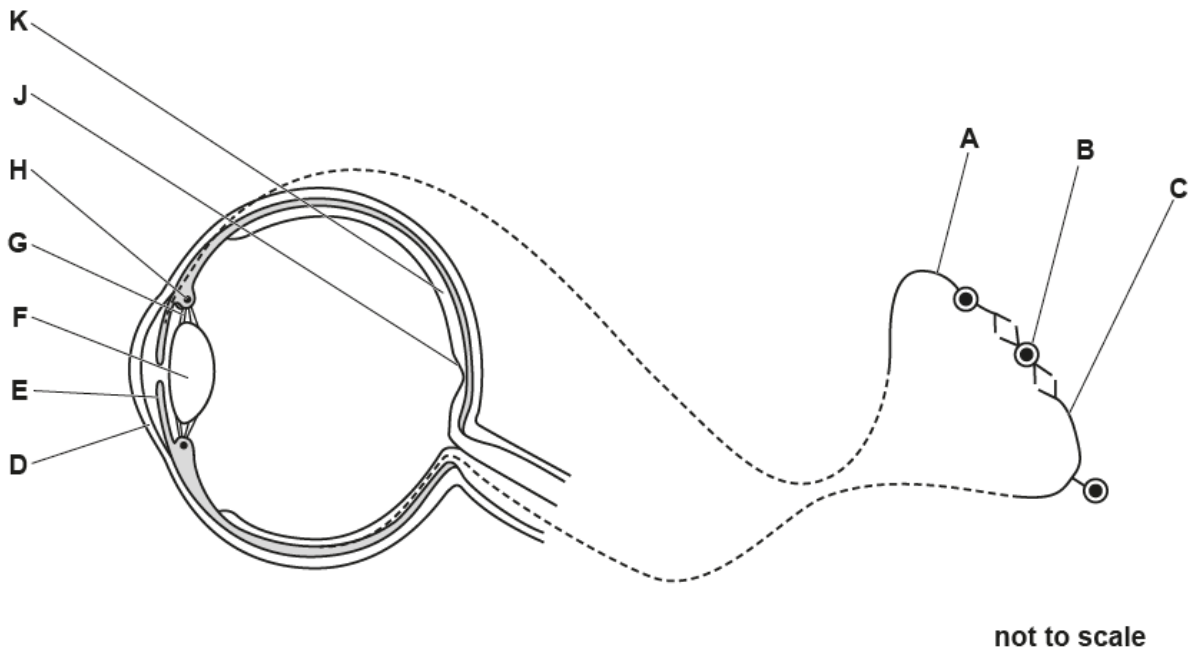


Fig. 1.1

(i) State the type of neurone identified as **A** in Fig. 1.1.

..... [1]

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(ii) Table 1.1 shows the names of some parts of the eye, their functions and the letters in Fig. 1.1 that identify the parts of the eye.

Complete Table 1.1.

Table 1.1

part of the eye	function	letter in Fig. 1.1
suspensory ligament		**G**
	contracts in response to a bright light	
cornea		
	contains a high density of cones for colour vision	

[4]

(c) **(i)** The eye can adjust how light is refracted through it in order to focus on a near object.

State **one** process that uses energy when focusing on a near object.

..... [1]

(ii) Mitochondria require oxygen to release energy. Oxygen is transported to cells in the eye by red blood cells.

State the name of the molecule in red blood cells that carries oxygen.

..... [1]

(iii) Explain how oxygen in the capillaries reaches the cells in the eye.

.....

.....

.....

.....

..... [2]

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(d) Eyelashes and eyelids are mechanical barriers that help to prevent particles and pathogens entering the eye.

(i) Give **two** other mechanical barriers that defend the body against pathogens.

1 .....

2 .....

[2]

(ii) State the name of the white blood cells that digest pathogens.

..... [1]

(iii) Conjunctivitis can be caused by pathogens and affects the tissues lining the eyelids and covering the sclera. People with conjunctivitis that is caused by a pathogen can develop active immunity.

Explain why the shape of specific parts of a pathogen is important in the development of active immunity.

.....

.....

.....

.....

.....

.....

..... [3]

(e) Most insects and some crustaceans have compound eyes.

State the name of the group that contains insects and crustaceans.

..... [1]

[Total: 17]

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Coordination and response – 2020 IGCSE 0610

1. Nov/2020/Paper_11/No.23

The list shows some processes that happen in the human body.

1 water enters cells by osmosis

2 muscles contract

3 impulses travel along neurones

4 oxygen diffuses into cells

Which of these require energy released by respiration?

A 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 1, 2, 3 and 4

2. Nov/2020/Paper_11/No.25

Which is the correct sequence of structures through which a nerve impulse passes in a reflex arc?

A effector → motor neurone → relay neurone → sensory neurone → receptor

B effector → sensory neurone → relay neurone → motor neurone → receptor

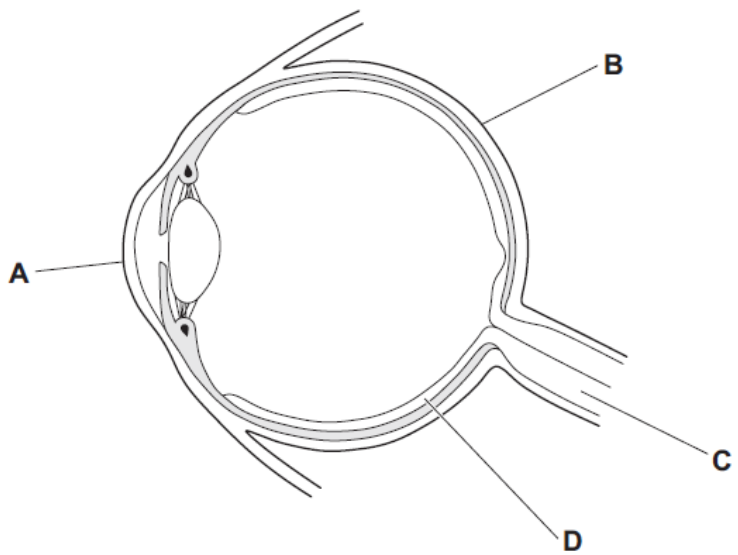
C receptor → motor neurone → relay neurone → sensory neurone → effector

D receptor → sensory neurone → relay neurone → motor neurone → effector

3. Nov/2020/Paper_11/No.26

The diagram shows an eye.

Which labelled part contains cells that are sensitive to light?



4. Nov/2020/Paper_11/No.27

Which hormone stimulates the development of male gametes?

A adrenaline

B insulin

C oestrogen

D testosterone

5. Nov/2020/Paper_12/No.25

Which structure contains relay neurones?

A gland

B muscle

C spinal cord

D synapse

6. Nov/2020/Paper_12/No.26

A man injures his arm in an accident. Afterwards, he can move his hand but cannot feel objects touching his hand.

What could cause this?

A Both sensory and motor neurones are cut.

B Effectors are damaged.

C Motor neurones are cut.

D Sensory neurones are cut.

7. Nov/2020/Paper_12/No.27

What are the effects of adrenaline on the human body?

	breathing rate	pulse rate	size of pupils
A	decreased	decreased	decreased
B	decreased	decreased	increased
C	increased	increased	decreased
D	increased	increased	increased

8. Nov/2020/Paper_13/No.25

Sensory neurones conduct impulses from

A the brain and spinal cord to muscles.

B one sense organ to another sense organ.

C sense organs to the brain and spinal cord.

D muscles to sense organs.

9. Nov/2020/Paper_13/No.26

What is a function of the cornea?

A carries impulses to the brain

B contains light-sensitive receptors

C controls how much light enters the eye

D refracts light

10. Nov/2020/Paper_13/No.27

Which responses are shown by the root of a plant?

	gravitropism	phototropism
A	–	–
B	–	+
C	+	–
D	+	+

key

+ = grows towards the stimulus

– = grows away from the stimulus

11. Nov/2020/Paper_21/No.23

Which is the correct sequence of structures through which a nerve impulse passes in a reflex arc?

A effector → motor neurone → relay neurone → sensory neurone → receptor

B effector → sensory neurone → relay neurone → motor neurone → receptor

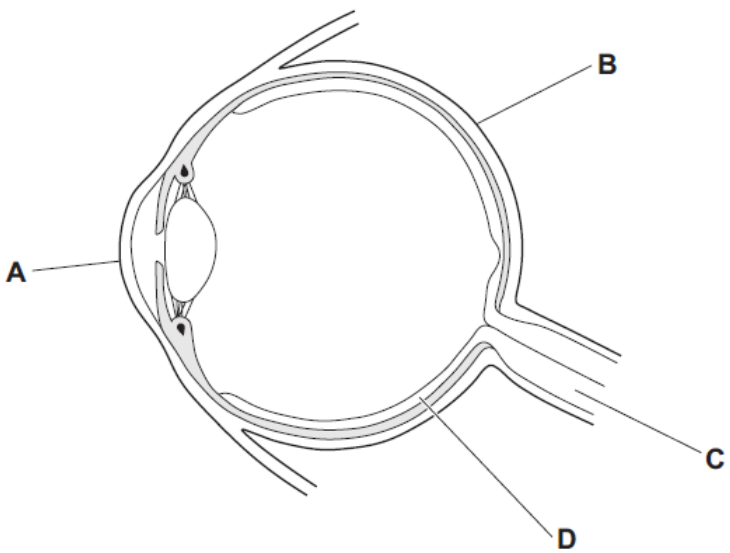
C receptor → motor neurone → relay neurone → sensory neurone → effector

D receptor → sensory neurone → relay neurone → motor neurone → effector

12. Nov/2020/Paper_21/No.24

The diagram shows an eye.

Which labelled part contains cells that are sensitive to light?



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13. Nov/2020/Paper_21/No.25

When hormones are secreted, they affect different parts of the body.

The table shows some features that are affected by four different hormones.

Which hormone is adrenaline?

	feature				
	pulse rate	blood glucose concentration	pupil size	menstrual cycle	sperm production
A	✓	✓	✗	✗	✗
B	✗	✗	✗	✗	✓
C	✓	✓	✓	✗	✗
D	✗	✗	✗	✓	✗

key
✓ = affected by hormone
✗ = not affected by hormone

14. Nov/2020/Paper_21/No.26

When the environment is hot, how do the arterioles in the skin and hair erector muscles react?

	arterioles	hair erector muscles
A	dilate	relax
B	dilate	contract
C	constrict	relax
D	constrict	contract

15. Nov/2020/Paper_22/No.23

Which structure contains relay neurones?

A gland

B muscle

C spinal cord

D synapse

16. Nov/2020/Paper_22/No.24

A man injures his arm in an accident. Afterwards, he can move his hand but cannot feel objects touching his hand.

What could cause this?

A Both sensory and motor neurones are cut.

B Effectors are damaged.

C Motor neurones are cut.

D Sensory neurones are cut.

17. Nov/2020/Paper_22/No.25

How does the skin react when the body becomes cold?

	arterioles supplying the skin surface	sweat production
A	constrict	decreases
B	dilate	increases
C	move towards skin surface	decreases
D	move away from skin surface	increases

18. Nov/2020/Paper_23/No.23

Sensory neurones conduct impulses from

A the brain and spinal cord to muscles.

B one sense organ to another sense organ.

C sense organs to the brain and spinal cord.

D muscles to sense organs.

19. Nov/2020/Paper_23/No.24

What is a function of the cornea?

A carries impulses to the brain

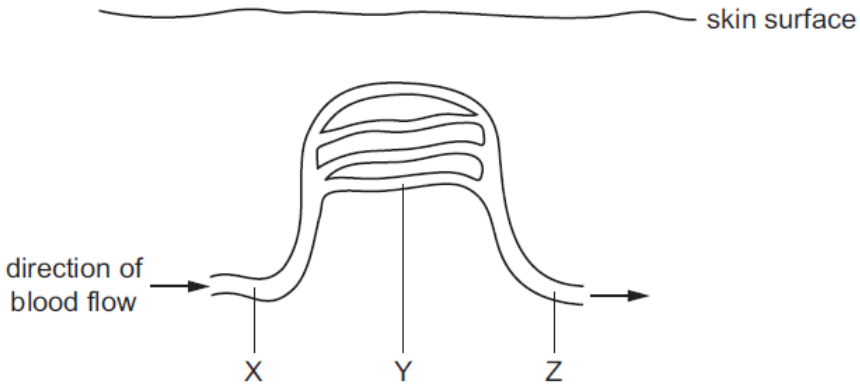
B contains light-sensitive receptors

C controls how much light enters the eye

D refracts light

20. Nov/2020/Paper_23/No.25

The diagram shows some blood vessels near the surface of the skin.



If vasodilation occurs at X, what happens to the blood flow at Y and Z?

	Y	Z
A	decreases	decreases
B	decreases	stays constant
C	increases	increases
D	increases	stays constant

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21. Nov/2020/Paper_31/No.4

(a) A scientist investigated how the growth of plant shoots was affected by the direction of light.

A light source was placed on one side of a shoot and the scientist recorded the appearance of the shoot after a few days.

Fig. 4.1 shows his results.

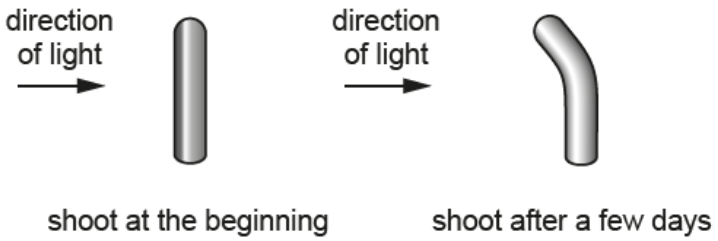


Fig. 4.1

(i) Describe the results shown in Fig. 4.1.

.....

.....

..... [1]

(ii) State the name of the response to light shown in Fig. 4.1.

..... [1]

(iii) Explain the advantage to a plant of the response shown in Fig. 4.1.

.....

.....

.....

.....

..... [2]

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(b) Plant roots absorb mineral ions by active transport.

(i) Define the term active transport.

.....

.....

.....

..... [3]

(ii) State the importance of these mineral ions in plants.

magnesium ions .....

.....

.....

nitrate ions .....

.....

.....

[2]

(c) State **two** uses of water in plants.

1 .....

2 .....

[2]

[Total: 11]

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22. Nov/2020/Paper_33/No.4

(a) Define the term homeostasis.

.....

.....

.....

.....

..... [2]

(b) The skin is an important organ involved in temperature regulation in mammals.

Fig. 4.1 is a diagram of a cross-section of mammalian skin.

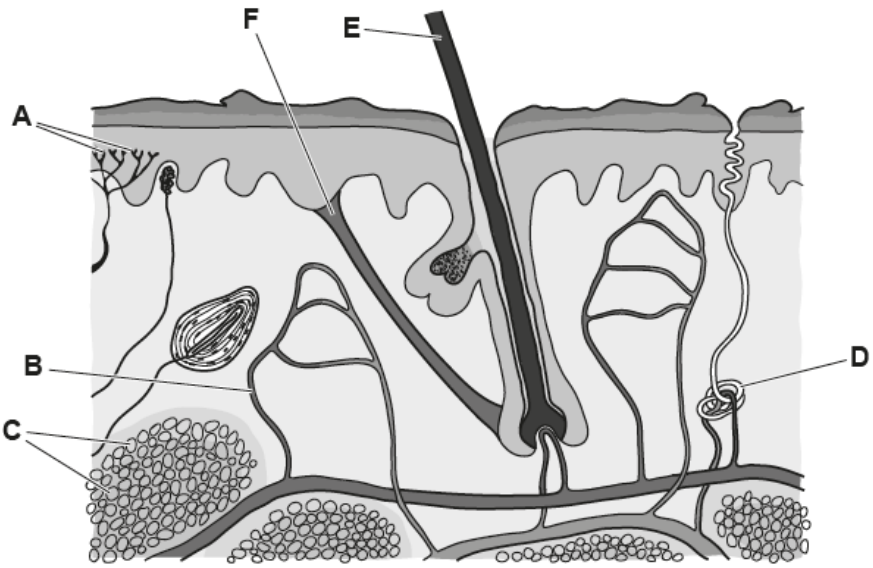


Fig. 4.1

(i) State the names of structures **A**, **B**, **C** and **D** on Fig. 4.1.

A .....

B .....

C .....

D .....

[4]

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(ii) Describe how the structures labelled **C**, **E** and **F** in Fig. 4.1 reduce heat loss in **cold** conditions.

.....

.....

.....

.....

.....

.....

..... [3]

(iii) Complete the sentences about maintenance of body temperature using the words and phrases from the list.

Each word or phrase may be used once, more than once or not at all.

blood **brain** **condenses** **evaporates**

neurones **receptors** **skin**

sweat **temperature** **water content**

Control of body temperature is coordinated by the ..... .

There are temperature ..... that sense the temperature of the

..... .

When the temperature gets too hot, glands release ..... onto

the surface of the skin and the water in it ..... reducing body

temperature.

[5]

[Total: 14]

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23. Nov/2020/Paper_41/No.6

Sensitivity is one of the characteristics of all living organisms.

(a) Define the term *sensitivity*.

.....

.....

..... [2]

(b) The eye is an example of a sense organ.

(i) Define the term *sense organ*.

.....

.....

..... [2]

(ii) Adrenaline is a hormone that is released in 'fight or flight' situations. It causes a change in the eye.

Complete Table 6.1 by stating the parts of the eye that change when adrenaline is released into the blood.

Table 6.1

action	part of the eye
muscle that relaxes	
muscle that contracts	
widens	

[3]

[Total: 7]

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24. Nov/2020/Paper_42/No.1

(a) Sensitivity is one of the characteristics of life. The eye is one of the major sense organs of vertebrates.

(i) Define the term *sensitivity*.

.....

.....

.....

..... [2]

(ii) Define the term *sense organ*.

.....

.....

.....

..... [2]

(b) Accommodation (focusing) is one of the functions of the eye.

Fig. 1.1 is a diagram of an eye that is focusing on a distant object.

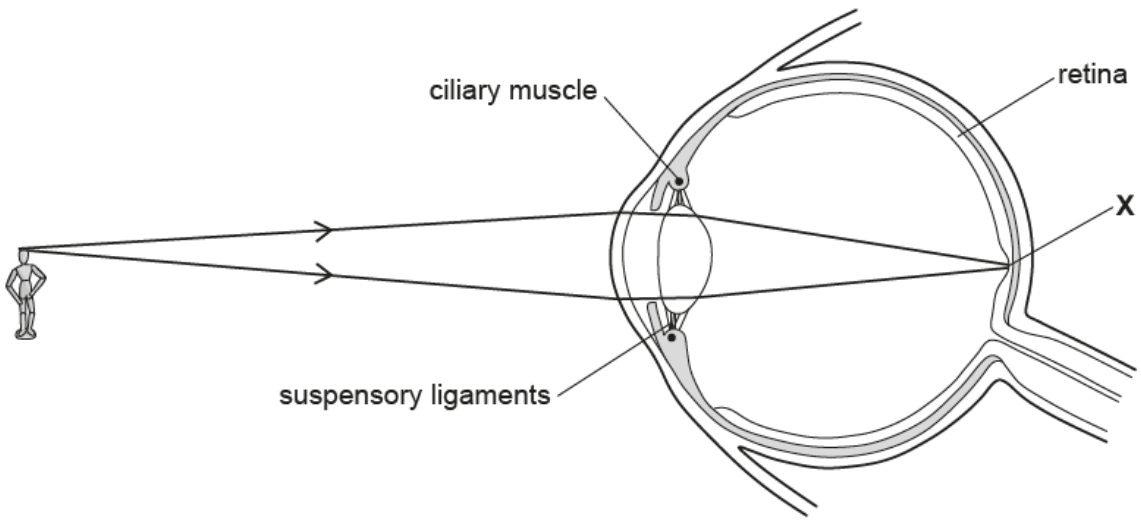


Fig. 1.1

(i) State the name of the part of the retina labelled **X**.

..... [1]

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Fig. 1.2 is an incomplete diagram of an eye that is focusing on a near object.

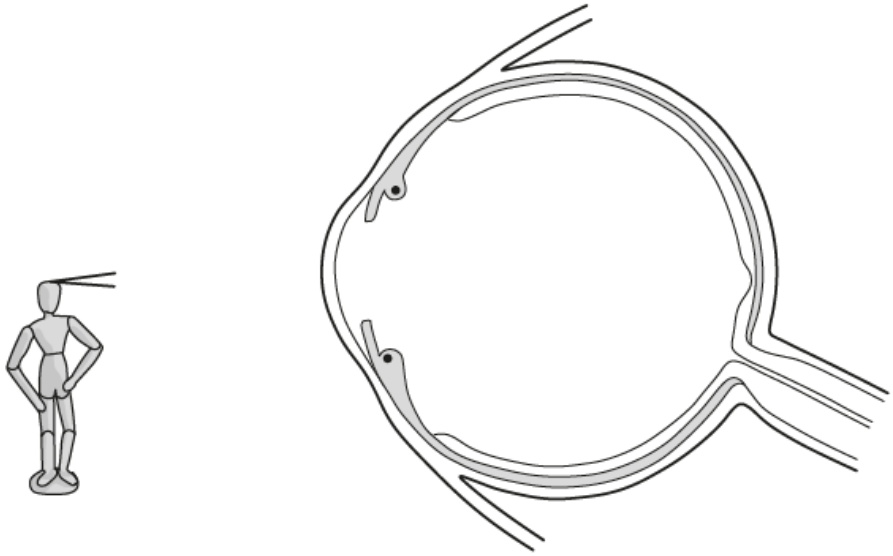


Fig. 1.2

(ii) Complete Fig. 1.2 by **drawing** the shape of the lens and the light rays from the object to the retina. [3]

(iii) Describe the roles of the ciliary muscles and suspensory ligaments in focusing on a **distant object**, as shown in Fig. 1.1.

.....

.....

.....

.....

.....

.....

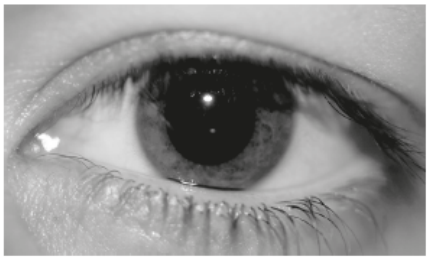
.....

..... [3]

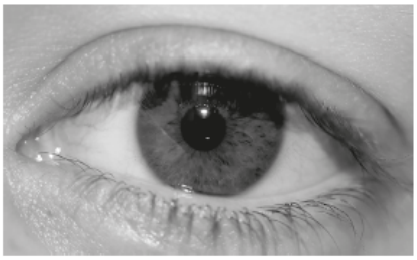
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(c) The eye also controls the amount of light that enters the pupil.

Fig. 1.3 shows an eye in low light and in bright light.



eye in low light



eye in bright light

Fig. 1.3

Describe the changes that occur in the eye when the light becomes bright, as shown in Fig. 1.3.

.....

.....

.....

.....

.....

.....

.....

..... [3]

(d) The change shown in Fig. 1.3 occurs automatically without thought.

State the name given to this type of action.

..... [1]

[Total: 15]

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Coordination and response – 2020 IGCSE 0610

1. March/2020/Paper_12/No.26

The table shows some of the responses that occur in humans when body temperature changes.

Which row shows the responses that occur when the body temperature increases **above** normal?

	hair lies flat	shivering	sweating
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✓
D	✓	✓	✓

key

✓ = yes

✗ = no

2. March/2020/Paper_12/No.27

What is an example of phototropism?

A a chemical messenger produced by a plant

B a painful sensation in response to a stimulus

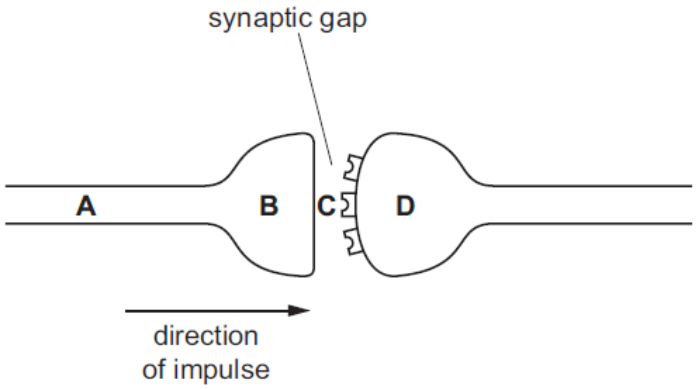
C the growth of a plant root towards the centre of the Earth

D the growth of a plant shoot towards light

3. March/2020/Paper_22/No.26

The diagram shows a synapse.

Where are vesicles containing neurotransmitter molecules found?



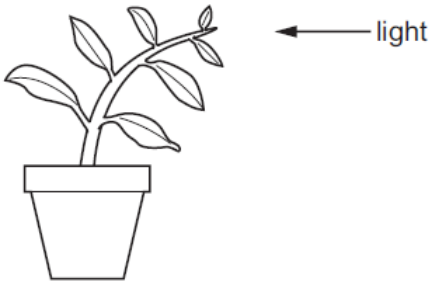
4. March/2020/Paper_22/No.27

Which row shows the state of the ciliary muscles and suspensory ligaments, when the eye is focusing on a near object?

	ciliary muscles	suspensory ligaments
A	contracted	slack
B	contracted	tense
C	relaxed	slack
D	relaxed	tense

5. March/2020/Paper_22/No.28

The diagram shows a shoot growing towards light.



Which statement about the role of auxin in phototropism is correct?

A Auxin will move to the dark side of the shoot and cause cells to elongate.

B Auxin will move to the dark side of the shoot and prevent cells from elongating.

C Auxin will move to the light side of the shoot and cause cells to elongate.

D Auxin will move to the light side of the shoot and prevent cells from elongating.

6. March/2020/Paper_42/No.3

(a) One of the characteristics of living organisms is sensitivity.

Define the term sensitivity.

.....

.....

.....

.....

..... [2]

(b) State the names of **two** sense organs.

1 .....

2 .....

[1]

(c) Scientists investigated the effect of adrenaline on blood glucose concentration in rats.

The rats were put into two groups:

- group **A** was given an injection of adrenaline
- group **B** was given an injection that did **not** contain adrenaline.

The blood glucose concentrations of the rats in both groups were monitored for three hours after the injections.

The rats did not eat for 12 hours before the investigation or while they were being monitored.

The results are shown in Fig. 3.1.

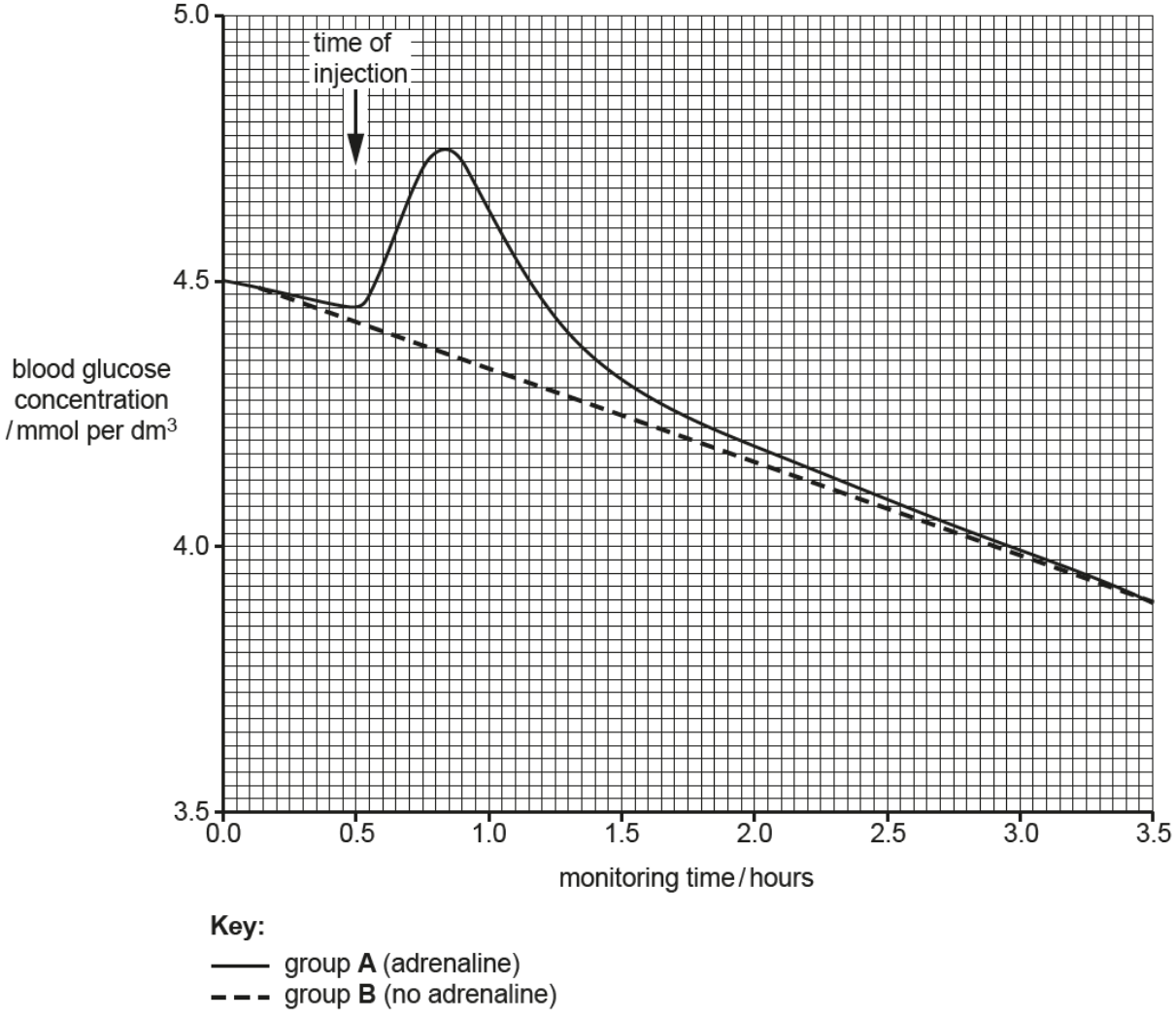


Fig. 3.1

(i) Suggest why group **B** was given an injection that did **not** contain adrenaline.

.....

.....

.....

.....

..... [2]

(ii) Describe and explain the results shown in Fig. 3.1 for group **A**.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

(d) Another group of rats was given an injection that did **not** contain adrenaline.

These rats were given food after 2 hours of monitoring.

Predict the changes to blood glucose concentration in this group of rats.

Sketch a line to show your prediction on the graph in Fig. 3.1. [2]

(e) Describe **two** effects of adrenaline on the body, **other** than a change in blood glucose concentration.

1 .....

2 .....

[2]

[Total: 14]

7. June/2020/Paper_11/No.22

What is the function of the optic nerve?

A to carry impulses from the brain to the retina

B to carry impulses from the retina to the brain

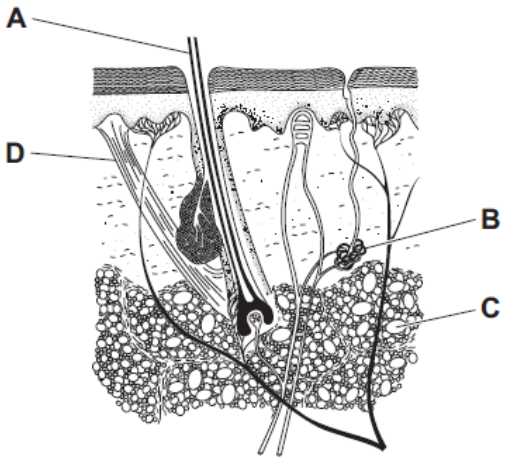
C to carry light from the brain to the retina

D to carry light from the retina to the brain

8. June/2020/Paper_11/No.24

The diagram shows a cross-section of the skin.

Which part produces a substance which cools the skin when it evaporates?



9. June/2020/Paper_11/No.25

Gravitropism and phototropism are names given to specific plant growth responses.

How do shoots and roots normally respond?

	direction of growth of shoots		direction of growth of roots	
	light	gravity	light	gravity
A	towards	away	away	towards
B	away	towards	towards	away
C	towards	away	towards	away
D	away	towards	away	towards

10. June/2020/Paper_22/No.22

Which structure transfers information to the central nervous system?

A effector

B motor neurone

C relay neurone

D sensory neurone

11. June/2020/Paper_22/No.23

Examples of responses to hormones are listed.

1 increased breathing rate

2 increased pulse rate

3 growth of body hair

4 widened pupils

Which responses are caused by the hormone adrenaline?

A 1, 2, 3 and 4

B 1, 2 and 4 only

C 2, 3 and 4 only

D 3 and 4 only

12. June/2020/Paper_22/No.24

Which part of the eye focuses light?

A cornea

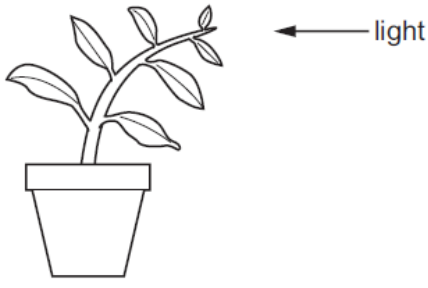
B iris

C lens

D retina

13. June/2020/Paper_22/No.25

The diagram shows a plant shoot growing towards the light.



Which response is shown by the shoot of the plant?

A gravitropism

B photosynthesis

C phototropism

D reflex

14. June/2020/Paper_13/No.22

When a man steps on a sharp object he moves his foot away very quickly.

In which part of his body are the effector cells involved in this action?

A brain

B muscle

C skin

D spinal cord

15. June/2020/Paper_13/No.23

Which row matches structures in the eye with their functions?

	focuses light	refracts light	sensitive to light
A	cornea	iris	retina
B	retina	lens	iris
C	iris	retina	lens
D	lens	cornea	retina

16. June/2020/Paper_13/No.25

What is meant by the term phototropism?

A absorbing mineral ions

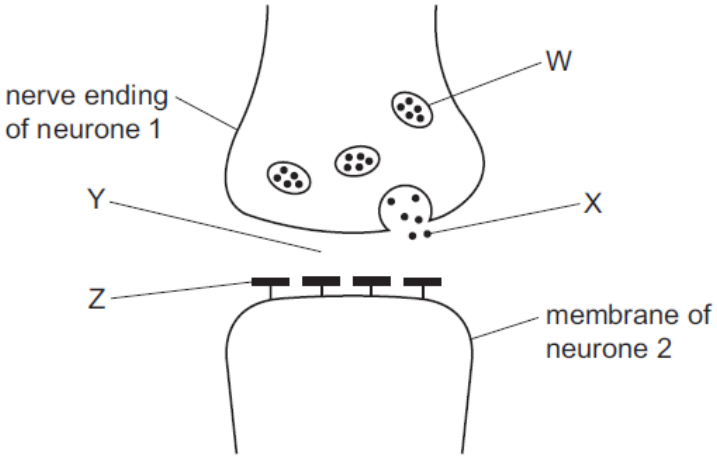
B absorbing water

C directional growth in response to gravity

D directional growth in response to light

17. June/2020/Paper_21/No.24

The diagram shows a synapse.



What are the labelled parts?

	W	X	Y	Z
A	synaptic cleft	neurotransmitter	vesicle	receptor
B	synaptic cleft	receptor	vesicle	neurotransmitter
C	vesicle	neurotransmitter	synaptic cleft	receptor
D	vesicle	receptor	synaptic cleft	neurotransmitter

18. June/2020/Paper_21/No.25

Which row shows the actions needed for the eye to focus on a distant object?

	ciliary muscles	suspensory ligaments	lens becomes
A	contract	slacken	thicker
B	relax	slacken	thicker
C	contract	tighten	thinner
D	relax	tighten	thinner

19. June/2020/Paper_21/No.26

The liver and the pancreas work together to control the concentration of glucose in the blood.

Which statement is correct?

A The liver converts the small molecule glucose to the large molecule glucagon.

B The liver releases the hormone insulin when blood glucose levels are too high.

C The pancreas does not respond to an increase in blood glucose levels.

D The pancreas responds to a fall in blood glucose by increasing the release of the hormone glucagon.

20. June/2020/Paper_22/No.24

Which responses occur in the iris of the eye when a person walks from a brightly lit area to a dimly lit area?

	circular muscle	radial muscle
A	contract	contract
B	contract	relax
C	relax	contract
D	relax	relax

21. June/2020/Paper_22/No.25

Which glands are endocrine glands?

A adrenal, pancreas, testes

B adrenal, ovaries, salivary

C ovaries, sweat, testes

D pancreas, salivary, sweat

22. June/2020/Paper_22/No.26

What are the effects of insulin and adrenaline on the concentration of blood glucose?

	effect of insulin on blood glucose concentration	effect of adrenaline on blood glucose concentration
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

23. June/2020/Paper_23/No.22

Blood glucose level is kept between 5–7 mmol per dm^3. The concentration of glucose in the intestine varies and is often less than that value.

What would be required for the absorption of glucose into the blood when the concentration of glucose in the intestine is less than 5 mmol per dm^3?

1 mitochondria

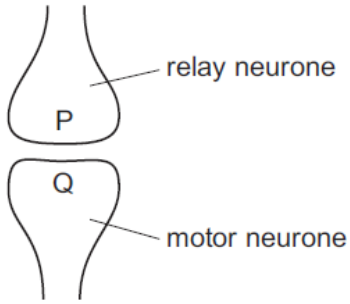
2 oxygen

3 membrane proteins

A 1 only **B** 1 and 2 only **C** 2 and 3 only **D** 1, 2 and 3

24. June/2020/Paper_23/No.23

The diagram shows a synapse between a motor neurone and a relay neurone.



What passes from P to Q?

A an electrical impulse

B an enzyme

C a hormone

D a neurotransmitter

25. June/2020/Paper_23/No.24

What change occurs in a 'fight or flight' situation?

A constriction of pupils

B decrease in breathing rate

C decrease in pulse rate

D increase in blood glucose concentration

26. June/2020/Paper_23/No.25

What happens when a person enters a very hot room?

A Sweating decreases and vasoconstriction increases.

B Sweating decreases and vasodilation decreases.

C Sweating increases and vasoconstriction increases.

D Sweating increases and vasodilation increases.

27. June/2020/Paper_31/No.8

(a) Fig. 8.1 is a diagram of a section of human skin.

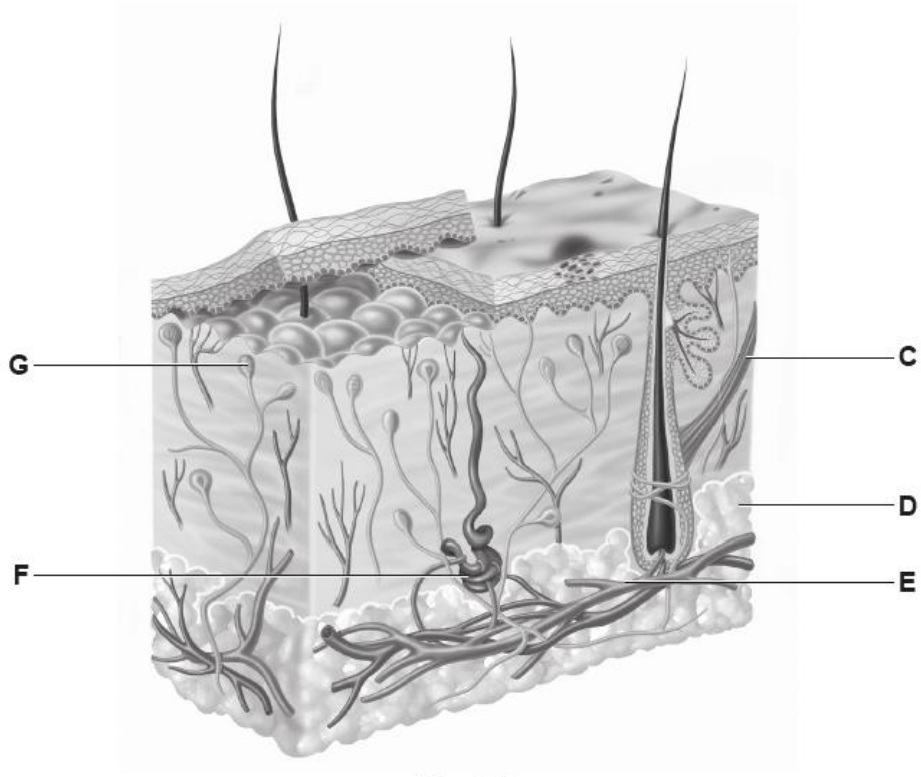


Fig. 8.1

State the names of the structures identified by the labels in Fig. 8.1.

C .....

D .....

E .....

F .....

G .....

[5]

(b) Complete the sentences about temperature control in humans by writing the missing words in the gaps.

If body temperature increases above normal, ... in the

..... detect the rise in temperature and impulses are sent to the skin.

Glands in the skin produce a liquid called ..... . The main component of this liquid is water.

The water in the liquid ..... from the surface of the skin using heat energy from the body. This lowers the body temperature.

The maintenance of a constant body temperature is an example of

..... .

[5]

[Total: 10]

28. June/2020/Paper_31/No.9

The eye is an example of a sense organ.

(a) Define the term *sense organ*.

.....

.....

.....

..... [2]

(b) Fig. 9.1 shows a section through the eye.

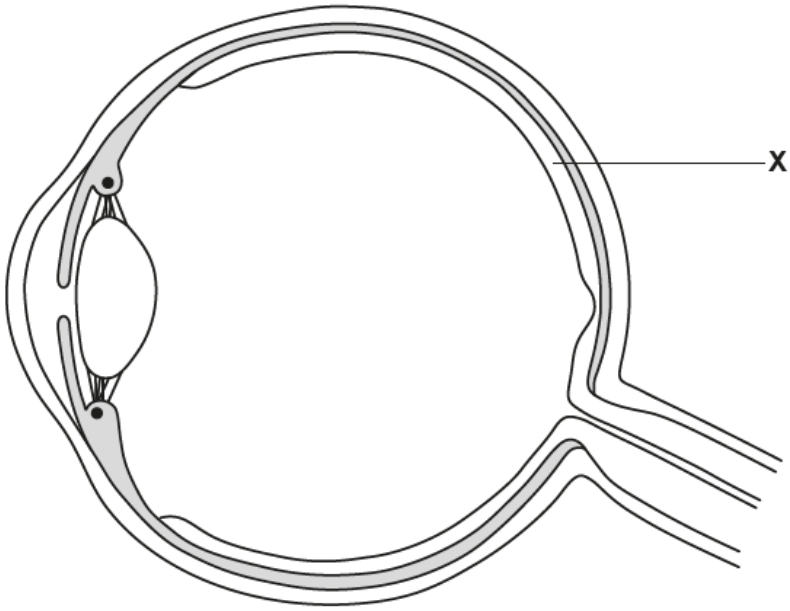


Fig. 9.1

(i) State the name of structure **X** in Fig. 9.1.

..... [1]

(ii) List **three** parts of the eye that light passes through to reach structure **X**.

1 .....

2 .....

3 .....

[3]

(iii) Label the optic nerve **on** Fig. 9.1 by drawing a label line and the letter **N**. [1]

(iv) State the function of the optic nerve.

..... [1]

[Total: 8]

29. June/2020/Paper_42/No.1

Homeostasis is the maintenance of a constant internal environment.

(a) Human skin is involved in the maintenance of a constant internal body temperature.

(i) Skin is an organ.

State why the skin is an organ.

.....

.....

..... [1]

(ii) State the name of the organ that coordinates the control of body temperature.

..... [1]

Fig. 1.1 shows a diagram of a section through human skin.

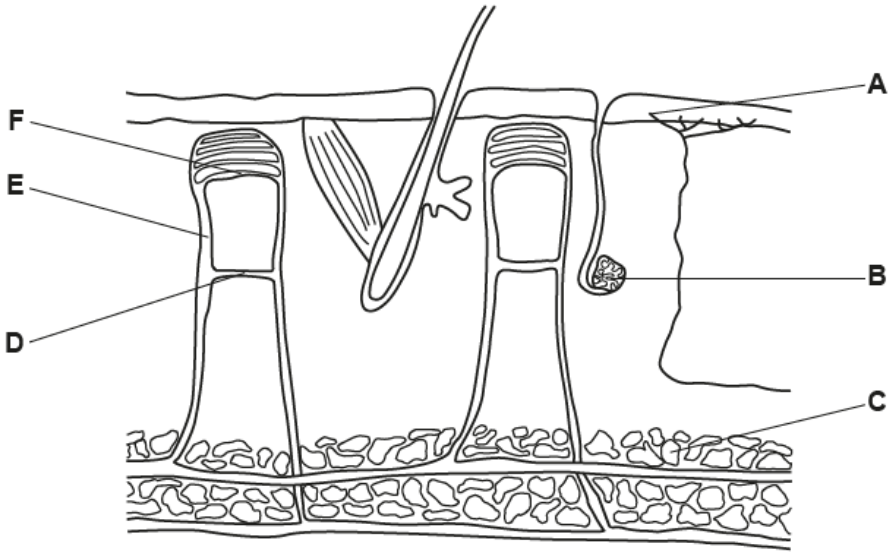


Fig. 1.1

(iii) State the names of structures **A**, **B** and **C** in Fig. 1.1.

A .....

B .....

C .....

[3]

(iv) Structure **D** is a shunt vessel and **E** is an arteriole.

Describe how these blood vessels are involved in maintaining a constant internal body temperature in a cold environment.

.....

.....

.....

.....

.....

.....

..... [3]

(b) Energy is used to maintain body temperature.

State **three other** uses of energy in humans.

1 .....

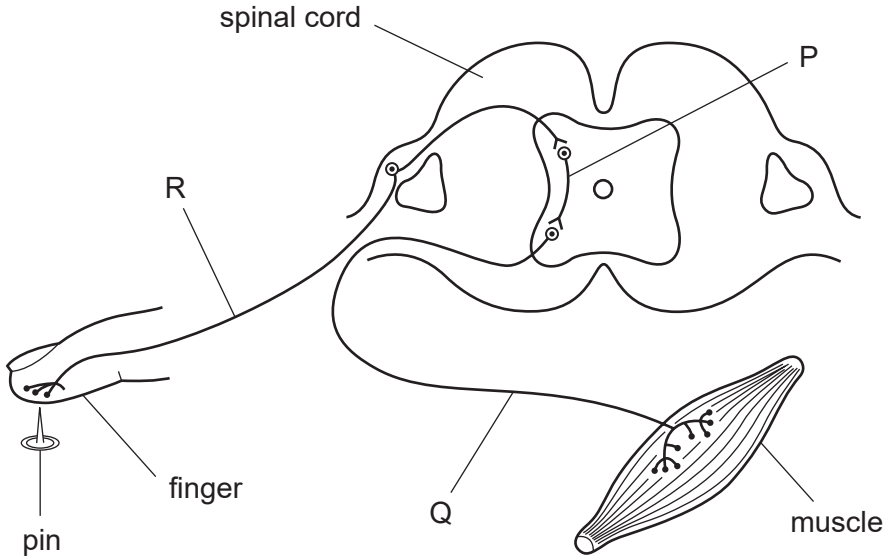
2 .....

3 .....

[3]

[Total: 11]

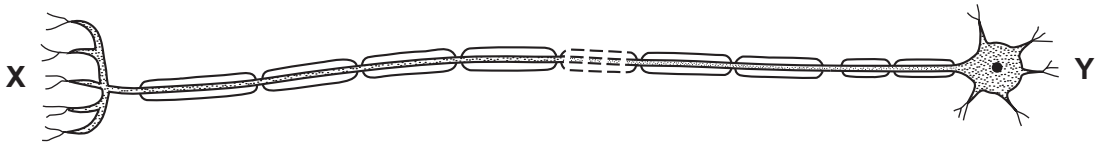
1 The diagram represents a simple reflex arc.



What is the sequence of nerve cells through which an impulse passes during a reflex action?

	first →		last
A	P	Q	R
B	Q	R	P
C	Q	P	R
D	R	P	Q

2 The diagram shows a neurone.



Which structures could be found at **X** and **Y**?

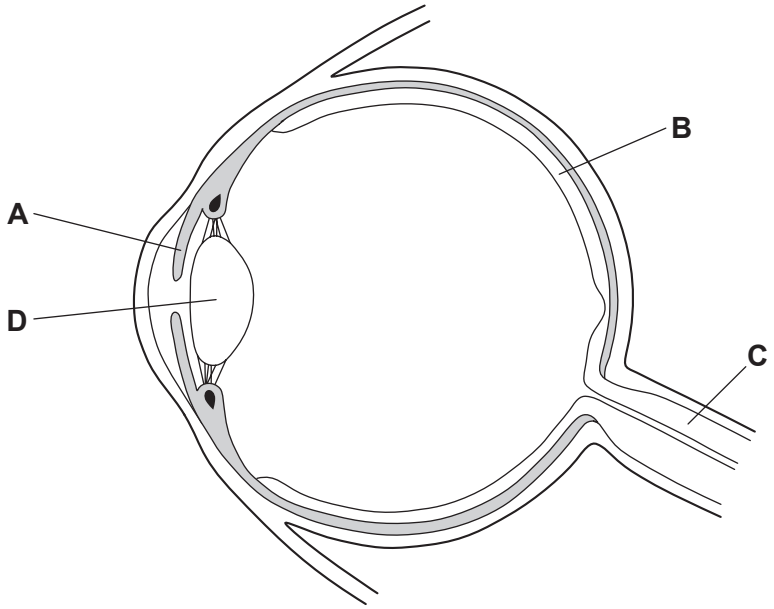
	X	Y
A	brain	intestine
B	brain	leg
C	eye	hand
D	gland	spinal cord

3 What will be the effect of strenuous exercise on the volume of water lost through the skin and the kidneys?

	volume of water lost through the skin	volume of water lost through the kidneys
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

4 The diagram shows a section through an eye.

Which structure controls how much light enters the pupil?



5 What are the effects of adrenaline?

	breathing rate	pulse rate
A	decreased	decreased
B	increased	increased
C	increased	no effect
D	no effect	increased

6 A person has been sitting in a room at 35 °C for 30 minutes.

What would be the effect of then drinking several glasses of iced water?

	blood temperature	rate of sweating
A	falls	falls
B	falls	rises
C	rises	falls
D	rises	rises

7 What is an example of gravitropism?

A a chemical messenger produced by a plant

B a painful sensation in response to a stimulus

C the growth of a plant root towards the centre of the Earth

D the growth of a plant shoot towards light

8 Which organ produces a hormone?

A heart

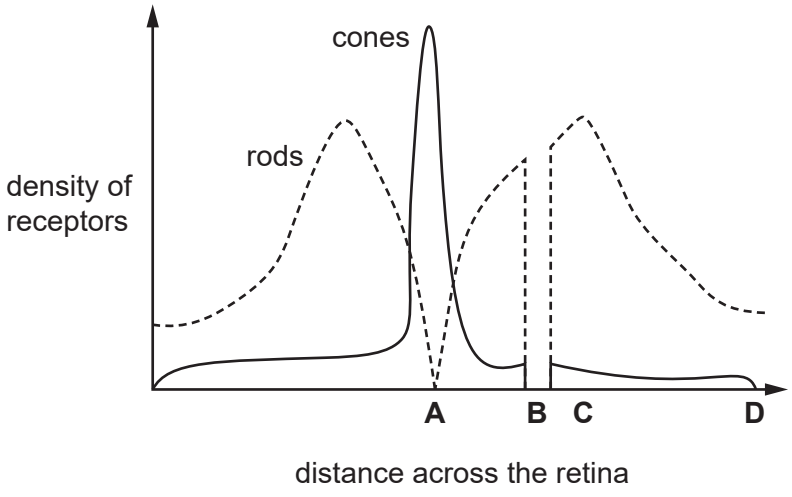
B lung

C ovary

D spinal cord

9 The diagram shows the density of rods and cones across a horizontal section of the retina.

What is the position of the optic nerve?



10 What are the effects of insulin and glucagon on the concentration of blood glucose?

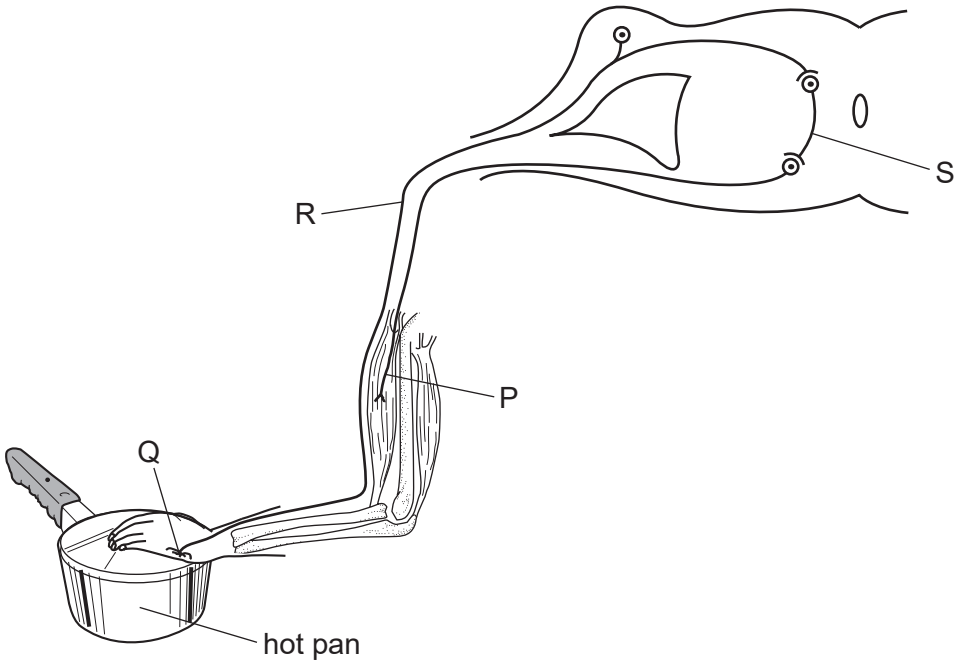
	effect of insulin on blood glucose concentration	effect of glucagon on blood glucose concentration
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

11 What effect does adrenaline have on blood glucose concentration and pulse rate?

	blood glucose concentration	pulse rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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12 The diagram shows the structures involved in a reflex action.



What is the sequence in which impulses pass through these structures?

A P → S → R → Q

B Q → R → S → P

C Q → P → R → S

D S → P → Q → R

13 Which part of the human eye is sensitive to light?

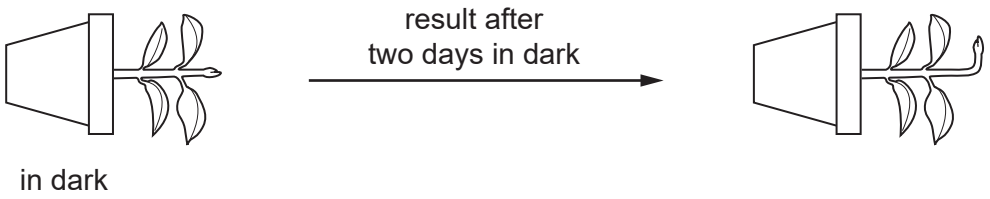
A iris

B lens

C optic nerve

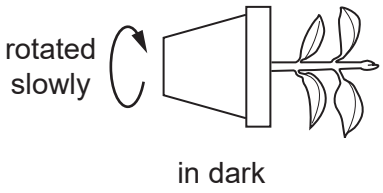
D retina

14 The diagram shows an experiment to investigate the response of a plant stem to gravity.

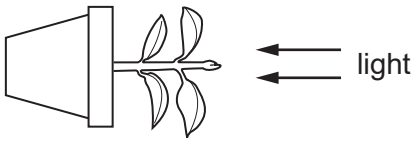


What is a suitable control for this experiment?

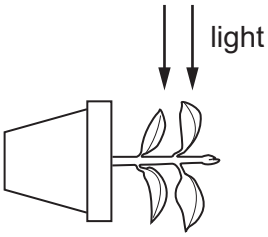
A



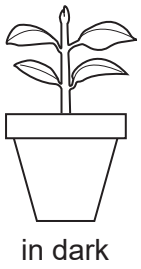
B



C



D



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15 The fovea of the eye has three kinds of cones absorbing light of different colours.

Which row is correct?

	type of cone stimulated			
	red sensitive	blue sensitive	green sensitive	colour seen
A	no	yes	yes	red
B	yes	no	yes	blue
C	yes	yes	no	green
D	yes	yes	yes	white

16 A person eats a large bowl of rice.

What happens to the amounts of insulin, glucagon and glycogen in their body?

	insulin	glucagon	glycogen
A	decreases	decreases	increases
B	decreases	increases	decreases
C	increases	decreases	increases
D	increases	increases	decreases

17 What is **not** an effect of the hormone adrenaline?

A decreased production of sweat

B dilated pupils

C increased blood glucose

D increased pulse rate

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18 Why do mammals sweat?

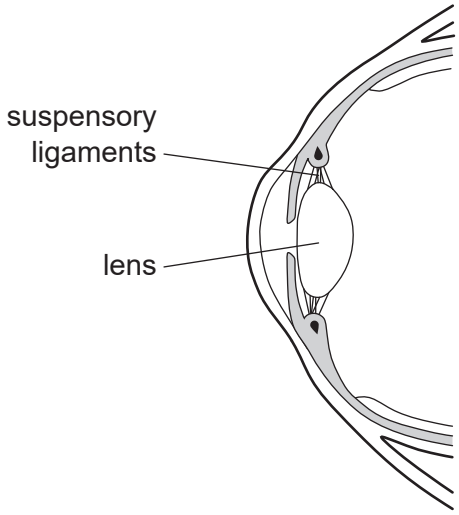
A to cool the body

B to lose water vapour through the skin surface

C to release energy through the oxidation of glucose

D to remove glucose from the blood

19 The diagram shows a section through part of the human eye.

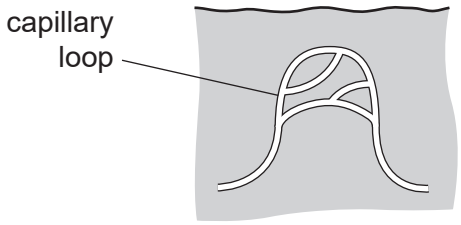


When a person looks at an object which is far away from their eye, which of the following happens?

	suspensory ligaments	lens
A	slacken	becomes fatter
B	slacken	becomes thinner
C	tighten	becomes fatter
D	tighten	becomes thinner

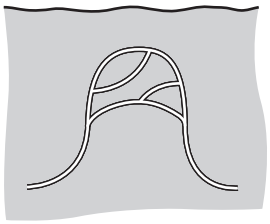
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20 The diagram shows a capillary loop in the skin of a mammal.

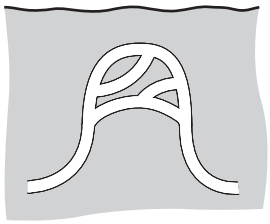


What will the capillary loop look like if the mammal becomes cold?

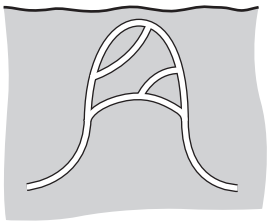
A



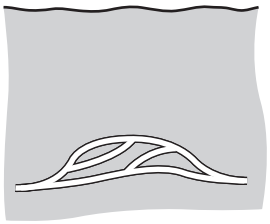
B



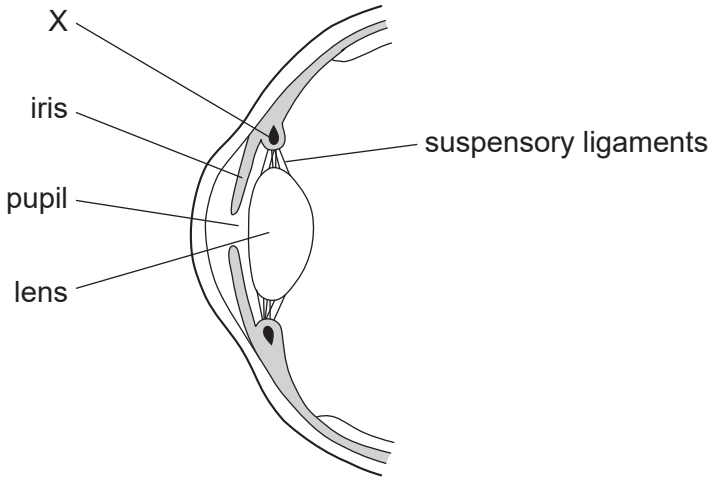
C



D



21 The diagram shows a section through part of the eye.



X is a contracted ciliary muscle.

What will happen when it relaxes?

A The lens will decrease its curvature.

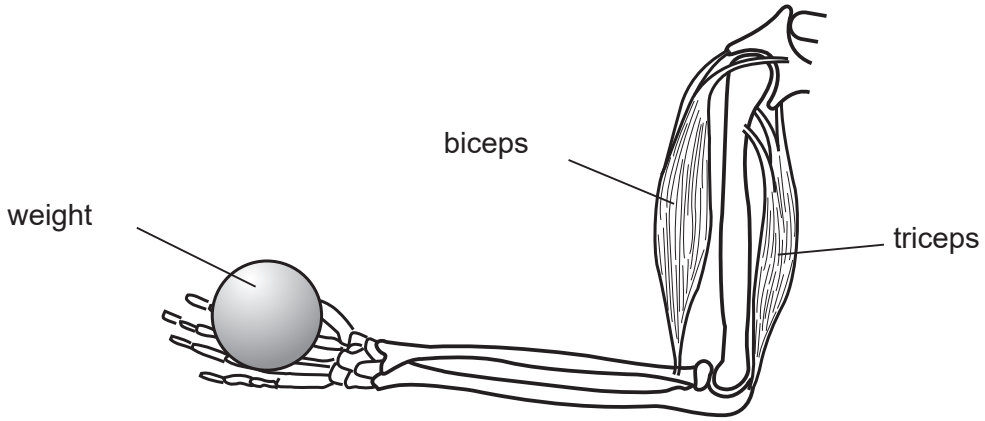
B The lens will increase its curvature.

C The size of the pupil will decrease.

D The size of the pupil will increase.

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22 The diagram shows muscles and bones in a person's arm.

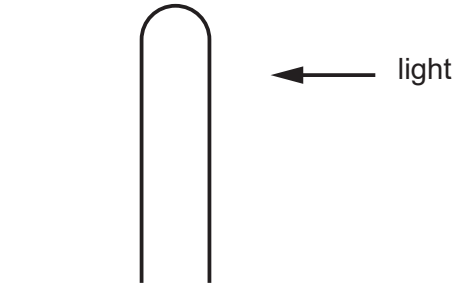


What happens to the muscles as the weight is lowered?

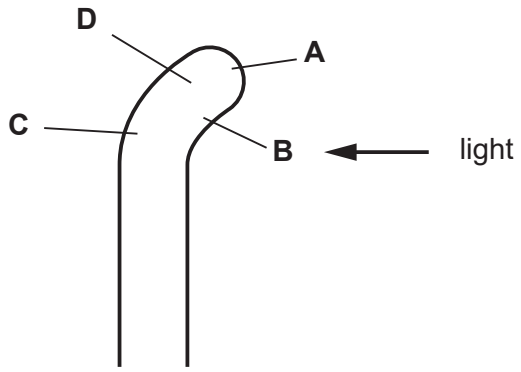
	biceps	triceps
A	lengthens	lengthens
B	lengthens	shortens
C	shortens	lengthens
D	shortens	shortens

23 In an experiment to investigate phototropism, a plant shoot is grown with light coming from one side only.

After two days, in which region has the greatest rate of growth occurred?



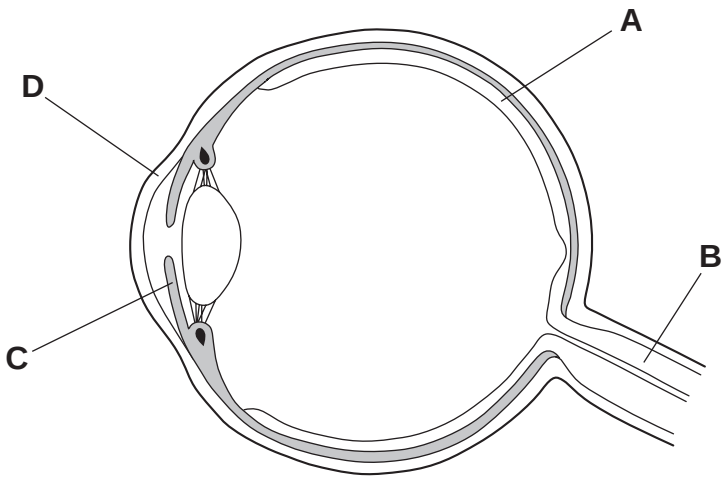
start of experiment



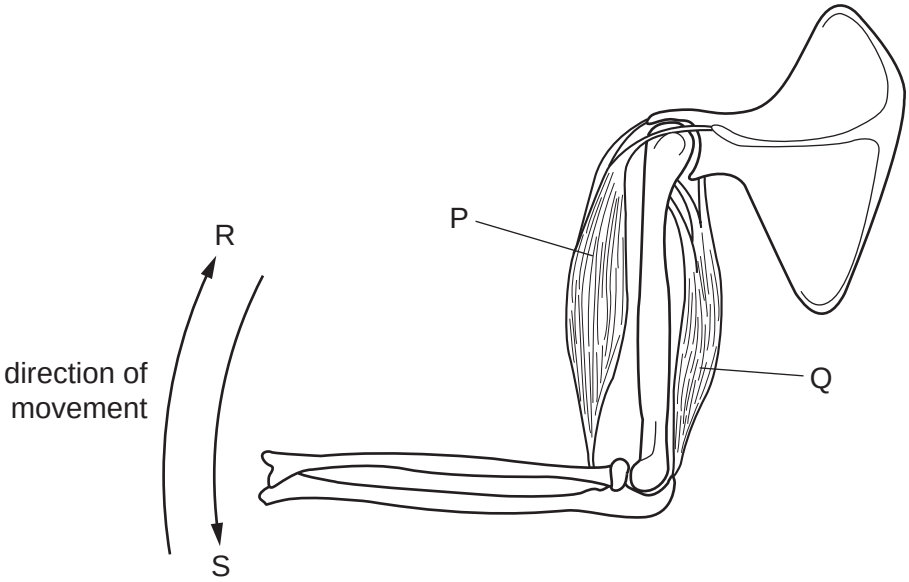
after two days

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24 Which labelled part of the eye contains muscle?



25 The diagram shows two antagonistic muscles and the directions of movement that they produce.



Which row correctly identifies these muscles and the directions of movement they produce on contraction?

	muscle P		muscle Q	
	name	movement	name	movement
A	biceps	R	triceps	S
B	biceps	S	triceps	R
C	triceps	R	biceps	S
D	triceps	S	biceps	R

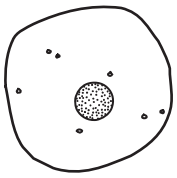
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26 How does the skin react when the body becomes very warm?

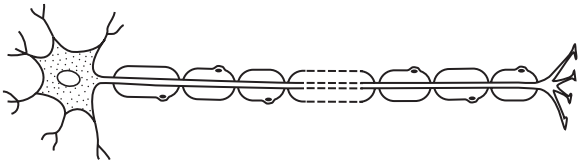
	blood vessels	sweat production
A	dilate	almost stops
B	dilate	increases
C	move towards skin surface	almost stops
D	move towards skin surface	increases

27 Which diagram shows a sensory neurone?

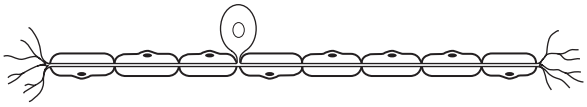
A



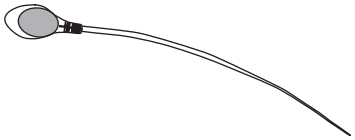
B



C

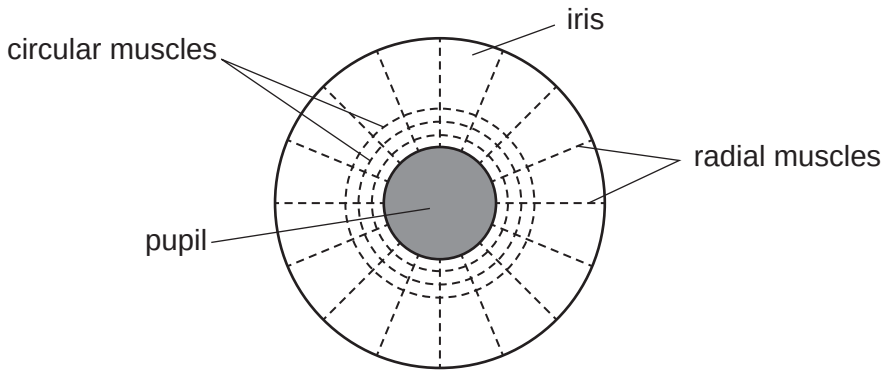


D



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28 The diagram shows the muscles that control the size of the pupil in an eye.



How do the muscles make the pupil smaller?

	circular muscles	radial muscles
A	contract	contract
B	contract	relax
C	relax	contract
D	relax	relax

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29 What would be the effects of vasodilation and sweating on the body temperature and on the amount of moisture on the surface of the skin?

	body temperature	moisture on skin surface
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

30 What would be the pupil size and lens shape of a person reading a mobile phone text message in a brightly-lit room?

	pupil size	lens shape
A	large	fat
B	large	thin
C	small	fat
D	small	thin

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Coordination and response P2 questions

11. Coordination and response

Content

11.1 Nervous system
11.2 Receptors
11.3 Reflex action
11.4 Hormones

Learning outcomes

Candidates should be able to:

(a) state that the nervous system (brain, spinal cord and nerves) serves to coordinate and regulate bodily functions

(b) identify, on diagrams of the central nervous system, the cerebrum, cerebellum, pituitary gland and hypothalamus, medulla, spinal cord and nerves

(c) describe the principal functions of the above structures in terms of coordinating and regulating bodily functions

(d) describe the gross structure of the eye as seen in front view and in horizontal section

(e) state the principal functions of component parts of the eye in producing a focused image of near and distant objects on the retina

(f) describe the pupil reflex in response to bright and dim light

(g) outline the functions of sensory neurones, relay neurones and motor neurones

(h) discuss the function of the brain and spinal cord in producing a coordinated response as a result of a specific stimulus (reflex action)

(i) define a *hormone* as a chemical substance, produced by a gland, carried by the blood, which alters the activity of one or more specific target organs and is then destroyed by the liver

(j) state the role of the hormone adrenaline in boosting the blood glucose concentration and give examples of situations in which this may occur

(k) state the role of the hormone insulin in controlling blood glucose concentration

(l) describe the signs (increased blood glucose concentration and glucose in urine) and treatment (administration of insulin) of diabetes mellitus

.

Coordination and response P2 questions

M/J18/21/Q8

(a) Describe **one** example of a simple reflex action and explain the importance to the body of this action.

.....

.....

.....

.....

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.....

.....[4]

(b) Describe how **named** components of the nervous system are involved in producing a reflex action.

.....

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.....[6]

[Total: 10]

Coordination and response P2 questions

M/J18/22/Q3

The table shows how the thickness of the lens of the eye changes when focussing on an object at different distances from the front of the eye.

distance from eye/cm	thickness of lens/mm
10	4.0
20	3.6
30	3.2
50	2.9
100	2.7
150	2.6
200	2.6

(a) (i) Describe the pattern shown by the data in the table.

.....

.....

.....[2]

(ii) Explain how **named** components of the eye change the thickness of the lens when focussing on an object as it moves further from the front of the eye.

.....

.....

.....

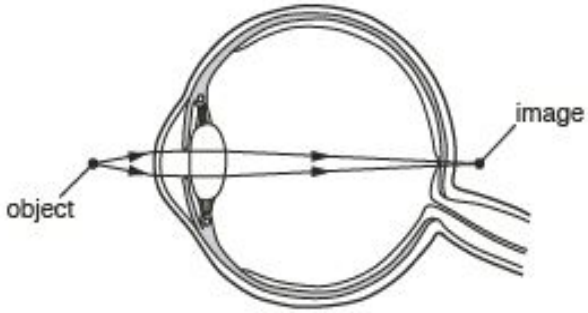
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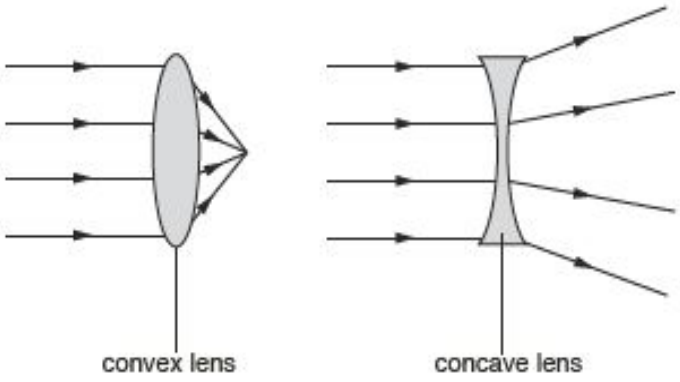
.....[4]

Coordination and response P2 questions

(b) As a person becomes older, the lens of the eye becomes harder and less elastic. This results in the person seeing an image of a close object that is out of focus.



The diagram below shows how light is refracted by two types of artificial lens that may be used to manufacture spectacles (glasses).



Suggest and explain which type of lens would be most suitable for this older person.

.....

.....

.....

.....

.....[3]

[Total: 9]

Coordination and response P2 questions

O/N17/21/Q6

Fig. 6.1a shows the right eye of a person before moving into an area of bright light.



Fig. 6.1a



Fig. 6.1b

(a) (i) Complete Fig. 6.1b to show the appearance of the right eye of the person shortly after moving into an area of bright light. [1]

(ii) With reference to named structures within the eye, describe the changes that take place when a person moves into an area of bright light.

.....

.....

.....

.....

.....[5]

(b) Name the type of action that occurs to make the changes that you have described and suggest why it is important that these changes take place.

type of action .....

why the changes take place .....

.....

.....

.....

[4]

[Total: 10]

O/N17/21/Q9(b)

(b) Describe the role of the hormone adrenaline and give **one** example of a situation in which adrenaline may be released.

.....

.....

.....

.....

.....

.....

.....[4]

Coordination and response P2 questions

O/N16/21/Q7

(a) Define the term *hormone*.

.....

.....

.....

.....

.....

..... [3]

(b) (I) State the role of the hormone insulin in controlling blood sugar concentration.

.....

.....

.....

.....

.....

..... [3]

(II) Name the condition caused if a person is unable to produce sufficient amounts of the hormone insulin.

Describe the signs of the condition that you have named, and its treatment.

name of condition

.....

description of signs and treatment

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 10]

Coordination and response P2 questions

O/N16/22/Q6

(a) As a person gets older, the lens of the eye loses its elasticity.
Describe and explain how light rays from a near object pass through the eye but may not form a sharply focused image for an older person.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[7]

(b) Suggest how reading glasses may bring the image into focus.

.....

.....

.....

.....

.....

.....

.....[3]

[Total: 10]

Coordination and response P2 questions

M/J16/21/Q8

The brain is one component of the nervous system.

(a) State **two** other components of the nervous system.

1 .....

2 .....[2]

(b) Fig. 8.1 shows the human brain.

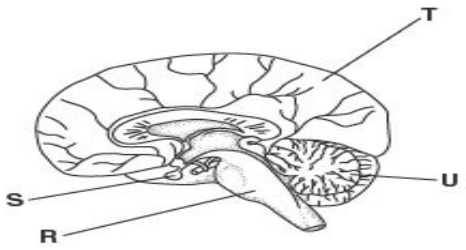


Fig. 8.1

Name and describe the functions of parts **R**, **S**, **T** and **U**, labelled in Fig. 8.1, in terms of coordinating and regulating bodily functions.

R .....

.....

.....

.....

.....

S .....

.....

.....

.....

.....

T .....

.....

.....

.....

.....

U .....

.....

.....

.....

..... [8]

[Total: 10]

Coordination and response P2 questions

O/N15/21/Q7

(a) A person looks up from focusing on a near object to focus on an object further away.

Describe how changes that take place in **named** components of the person's eye produce a focused image of the distant object.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

(b) Suggest why these changes that take place in the eye are controlled by the nervous system, rather than by a hormone.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 10]

Coordination and response P2 questions

M/J15/22/Q3

Fig. 3.1 shows the blood supply to cells in the liver.

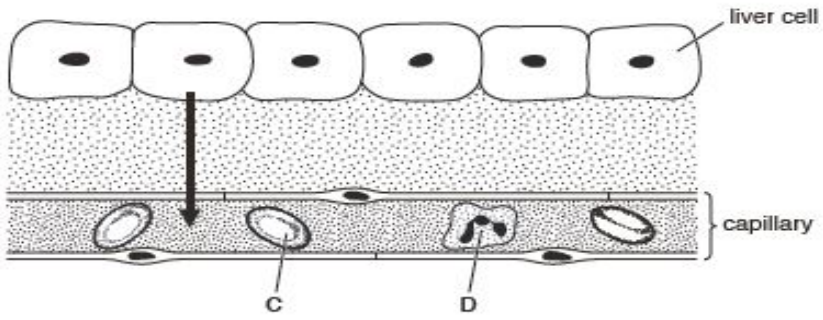


Fig. 3.1

(a) (i) Name the cells labelled **C** and **D** in Fig. 3.1.

C .....

D ..... [2]

(ii) The arrow in Fig. 3.1 shows the movement of substances from the liver cells into the capillary.

Name **three** substances that move in the direction shown.

1 .....

2 .....

3 ..... [3]

(b) (i) Describe the effect of adrenaline on liver cells.

.....

.....

.....

..... [2]

(ii) State a situation in which this might occur.

..... [1]

(c) Sometimes the liver is unable to remove glucose from the blood. This condition is called diabetes.

(i) State **two** symptoms of this condition.

1 .....

2 ..... [2]

(ii) State how this condition is treated.

.....

..... [1]

[Total: 11]

Coordination and response P2 questions

O/N14/22/Q7

(a) Explain what is meant by the term *reflex action*.

.....

.....

.....

.....

.....

..... [3]

(b) (I) Name a reflex action and explain how it is brought about.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

(II) Explain its value to the human body.

.....

.....

.....

..... [2]

[Total: 10]

Coordination and response P2 questions

O/N13/21/Q2

2 (a) Receptors receive stimuli and convert them into electrical impulses.

Fig. 2.1 shows the pathway taken by electrical impulses in a reflex action. Complete Fig. 2.1 by writing the name of the appropriate component on the dotted lines.

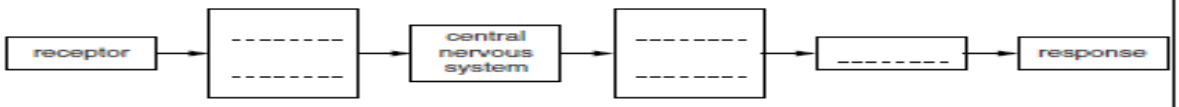


Fig. 2.1 [2]

(b) The brain is one part of the central nervous system. Fig. 2.2 is a diagram of the human brain.



Fig. 2.2

Damage to the brain can sometimes occur as the result of an accident.

Name the parts of the brain labelled **A** and **B** in Fig. 2.2 and suggest a problem that may be experienced by a person who has damage to that part of the brain.

part **A** .....

problem caused by damage

.....

.....

part **B** .....

problem caused by damage

.....

.....

[4]

(c) Scientists are able to treat people with some types of brain damage. They may do this by injecting the patient with cells taken from another person (donor). These cells then travel to the brain where they divide and specialise to become groups of fully functioning brain cells.

(i) State the type of cell division that takes place when the cells that have been injected reach the patient's brain.

.....[1]

(ii) State the term used to describe a group of cells that are specialised to perform a specific function.

.....[1]

(d) Female patients were injected with cells from male donors. After a period of time, the scientists examined brain cells from these patients and looked for groups of brain cells containing the Y chromosome.

Explain why finding groups of brain cells containing the Y chromosome would suggest to the scientists that the treatment may have been successful.

.....

.....

.....

.....

.....

.....[3]

[Total: 11]

Coordination and response P2 questions

M/J12/21/Q4

Fig. 4.1 shows a horizontal section of the human eye and the pathway taken by light rays as they leave an object.

(a) Complete the diagram by continuing the lines from the object to show how the light rays produce a focussed image on the retina.

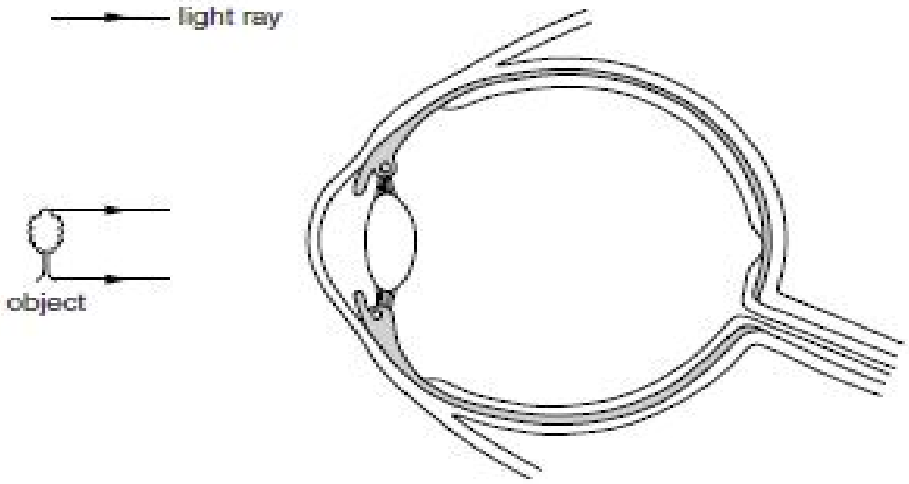


Fig. 4.1

[3]

(b) **(I)** State how the appearance of the pupil in the eye will change when a person moves from dim light into an area of bright light.

..... [1]

(II) Explain how this change is brought about by structures in the eye.

.....

.....

..... [2]

(c) The change in appearance of the pupil when entering an area of bright light is a reflex action.

(I) Define the term *reflex action*.

.....

..... [2]

(II) Suggest why drugs that prevent this reflex action from occurring should be avoided.

.....

.....

..... [2]

[Total: 10]

Coordination and response P2 questions

M/J12/22/Q1

Fig. 1.1 shows the human eye in horizontal section.

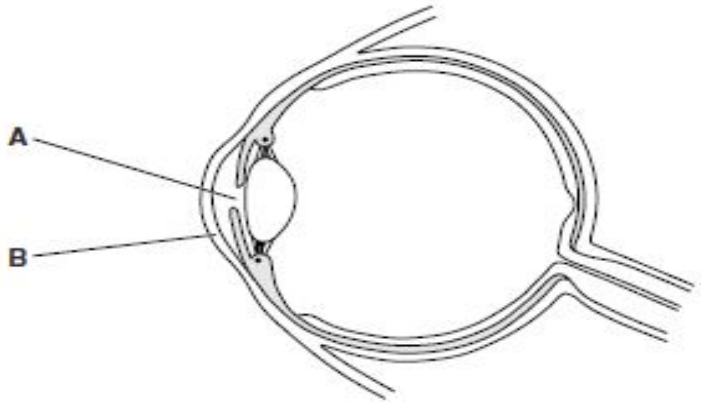


Fig. 1.1

(a) (i) Identify **A** and **B** that are labelled on Fig. 1.1.

A .....

B ..... [2]

(ii) Describe what happens to **A** when light entering the eye becomes less intense.

.....

..... [1]

(iii) Place a letter **Z** on Fig. 1.1 where a response occurs as a result of a reflex action. [1]

(b) In some people's eyes, the retina becomes completely detached from the tissues beneath. Explain how this will affect their ability to see.

.....

.....

.....

.....

..... [3]

(c) As people get older, cloudy (opaque) patches sometimes form in the lens of the eye. These are called cataracts.
Suggest how cataracts might affect the ability of the lens to carry out its function.

.....

.....

.....

..... [3]

[Total: 10]

Coordination and response P2 questions

O/N11/22/Q3

The following is a list of terms associated with a person's responses. Each term is identified by a letter.

A – brain
B – contraction
C – gland
D – hormone
E – impulse
F – motor neurone
G – muscle
H – receptor
I – sensory neurone
J – spinal cord

(a) **Using their identifying letters only**, place the terms in the order in which they are involved in the following:

(i) Peeling an onion causes a student's eyes to water.

.....[2]

(ii) A student decides to open a book.

.....[1]

(iii) A student hears a sudden loud noise and, shortly afterwards, his heart beats faster.

.....

.....[2]

(b) Name the type of response involved in **(a)(i)** and **(a)(ii)**.

(a)(i) .....

(a)(ii) .....[2]

(c) Describe how responses involving the nervous system differ from those that involve the effects of hormones.

.....

.....

.....

.....[3]

[Total: 10]

Coordination and response P2 questions

M/J11/21/Q9

(a) For each of the following, state where, in the reflex arc, they are found and state their functions.

- sensory neurones

.....

.....

- relay neurones

.....

.....

- motor neurones

.....

.....[5]

(b) Explain why, just after hearing a sudden loud noise, a person's heart beats faster.

.....

.....

.....

.....

.....

.....

.....

.....[5]

[Total: 10]

Coordination and response P2 questions

O/N10/22/Q6

(a) Explain what is meant by a *hormone*.

.....

.....

.....

.....

.....

.....

.....

.....[4]

(b) Give an example of a hormone and describe how it is involved in maintaining constant conditions within the human body.

.....

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.....

.....

.....[6]

[Total: 10]

Coordination and response P2 questions

M/J10/21/Q7

7 Describe the principal functions, in terms of co-ordinating and regulating the body, of

(a) the cerebrum,

.....

.....

.....

.....

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.....

.....

.....[5]

(b) the cerebellum,

.....

.....

.....

.....

.....

.....[2]

(c) the hypothalamus.

.....

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.....

.....

.....

.....[3]

[Total: 10]

Coordination and response P2 questions

O/N09/Q6

(a) Define a *hormone*.

.....

.....

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.....

.....

..... [4]

(b) Describe how the nervous system is involved in producing a **named** reflex action.

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.....

.....

..... [6]

[Total: 10]

Coordination and response P2 questions

Mark schemes will use these abbreviations:
; separates marking points
/ alternatives
() contents of brackets are not required but should be implied
R reject
A accept (for answers correctly cued by the question, or guidance for examiners)
Ig ignore (for incorrect but irrelevant responses)
AW alternative wording (where responses vary more than usual)
AVP alternative valid point (where a greater than usual variety of responses is expected)
ORA or reverse argument
underline actual word underlined must be used by candidate
+ statements on both sides of the + are needed for that mark

.M/J18/21/Q8

8(a) named stimulus / trigger for a specific reflex action **;**
correct named receptor for stimulus given **;**
action described correct for example given **;**
importance of specific action explained **;**
4
8(b) synapse (anywhere in sequence) **;**
impulse / electrical pulse (anywhere in sequence) **;**
receptor **;**
detection of stimulus **;**
then
sensory neurone **;**
relay / inter(mediate) / connector neurone **;**
reference to CNS / brain / spinal cord **;**
then
motor neurone **;**
effector / named effector **;**
action of effector or described **;**
6
Ig signal / message

M/J18/22/Q3

3(a)(i) **1** distance from eye increases **+** thickness / width of lens decreases
or
inverse **;**
2 up to 150 **+** cm **or** up to 2.6 **+** mm **or** then constant **AW ;**
2 A distance from eye decreases **+**
thickness / width of lens increases
3(a)(ii) **1** ciliary **;**
2 muscles **+** relax **;**
3 suspensory ligaments **;**
4 ligaments **+** tighten / taut **AW ;**
5 lens **+** pulled / stretched **;**
4
3(b) (*if convex stated*) **no mark for convex**
1 light **+** rays **;**

Coordination and response P2 questions

2 increased / more **+** refraction / bending **;**
3 before entering eye **;**
4 converge / meet **+** on retina / fovea **;**
5 object / image **+** clear / in focus **;**
OR
(*if concave, i.e. incorrect, **or** no type of lens stated*)
6 reference to light rays **+** refraction **AW +** before entering eye **;**

O/N17/21/Q6

6(a)(i) shaded circle drawn in iris **+** smaller than in 6.1(a) **; 1**
6(a)(ii) iris **+** muscle **;**
circular **+** contract **;**
radial **+** relax **;**
pupil **;**
constricts **AW ;**
5
6(b) *(type of action)*
reflex / involuntary **;**
(why the changes take place)
protection / prevent damage **;**
reduces light (entering) **;**
retina / rods / cones / photoreceptors **;**

O/N17/21/Q9(b)

9(b) correct named situation **;**
target organ / named **;**
(any two effects from)
glycogen to glucose / sugar **;**
increased (heart) rate **;**
pupils dilate **;**
dry mouth **;**
breathing rate change **;**
diversion of blood to muscle / from gut **;**
4
increased heart rate = 2 marks (named target organ
+ effect)

O/N16/21/Q7

7(a) chemical (substance) **;**
produced by (endocrine / ductless) gland **;**
(secreted) into / carried by blood **;**
(effect on) target organ **;**
destroyed by liver **;**
3 lg named examples of hormones

Coordination and response P2 questions

7(b)(i) insulin is secreted when blood sugar / glucose is (too)
high / lowers blood sugar / glucose levels **;**
(increased) sugar / glucose into cells **;**
reference to liver / muscle (cells) **;**
(converted) to glycogen **;**
(glycogen) for storage / is insoluble **;**
3

7(b)(ii) diabetes **;**
increased blood sugar / glucose concentration **;**
sugar / glucose in urine **;**
frequent urination **;**
tired / thirsty / weight loss **;**
insulin (by injection or tablet) **;**
dietary control **;**
4
A sweet-smelling breath / urine
R injection alone as a treatment, insulin required for mark
Total: 10

O/N16/22/Q6

6(a) 1 light / rays **+** bent / refracted / converged **;**
following points must be related to, or imply, the idea
of light / rays (accept image) passing through:
2 cornea **;**
3 pupil **;**
4 aqueous / vitreous humour / bodies **;**
5 lens **;**
6 (lens has) less ability to change shape
AW / accommodate **;**
7 (therefore lens unable to bulge) fully / enough **;**
8 (lens) cannot refract sufficiently / decrease focal
length sufficiently **AW ;**
9 (cannot focus on the) retina / fovea / yellow spot **;**
7
6(b) 1 convex (reference to spectacle lens) **AW ;**
2 (light / rays) bend / refract / converge **;**
3 before entering eye / (eye) lens **;**
4 compensate for thinness / lack of convexity or fatness
in eye lens **;**
5 (to focus on the) retina / fovea / yellow spot **;**
3

M/J16/21/Q8

8 (a) spinal cord ;
nerves / neurones ;
named receptor / sense organ ;
[2]
(b) R + medulla ;
control of heart
rate / breathing / involuntary
actions ;
relay of impulses between brain
and spinal cord ;

Coordination and response P2 questions

S + pituitary gland ;
secretes / releases hormone(s) ;
example of named hormone
released + correct function ;
T + cerebrum / cerebral
hemispheres ;
voluntary movement or example
of ;
thought / memory / any other
acceptable function ;
U + cerebellum ;
coordination of movement ;
maintenance of
posture / balance ;
A functions only if linked to correct
named part of the brain
e.g. TSH released which stimulates the
thyroid gland to secrete thyroxine.
[max 8]
[Total: 10

O/N15/21/Q7

7 (a) ciliary muscles ;
relax ;
suspensory ligaments ;
tighten / become taut / pulled AW ;
increased tension / pull on lens ;
lens long + thin / flatter / less fat / convex ;
light refracted / bent (by lens) ;
(light) converges / (produces image) on retina / fovea ;
[max. 6]
R bent more
(b) nervous system quicker AW / hormones slower ;
example of relevant situation ;
electrical / impulses ;
via neurones / nerve cells ;
hormones are chemical ;
carried / transported via blood ;

M/J15/22/Q3

3 (a) (i) C – RBC / erythrocyte ;
D – WBC / phagocyte / polymorph /
neutrophil ;
A polymorph / neutrophil
[2

(b)(ii) Urea,CO2,Iron,glucose,vitamins.water

(i)gylvogen broken down to glucose. Glucose released increases blood glucose conc.

(ii)fight or fright(Described)

(c)increased blood glucose conc./sugar level

Coordination and response P2 questions

Presence of glucose

(ii)insulin

O/N14/22/Q7

(a) fast / instant ;
automatic / involuntary / spontaneous / unconscious / AW ;
response / reaction ;
to a stimulus ;
[max. 3]
A ref. to no decision involved
(b) (i) named stimulus* ;
correct receptor / named* ;
impulse / electrical + pulse ;
sensory / afferent / receptor + motor / efferent / effector neurones, in correct order ;
CNS / spinal cord* ;
correct or named effector* ;
correct action (of effector)* ;
[max. 5]
* description must match
example
R brain if it directs response
(ii) automatic / innate / does not need to be learnt ;
ref. protection / aids survival / damage limitation ;
[2]
A example, e.g. prevents too much
light entering eye
[Total: 10]

O/N13/21/Q2

2 (a) Box 1: sensory / afferent neurone
Box 2: motor / efferent neurone /fibre
Box 3: effector / muscle / gland / A named effector
3 correct = 2 marks , 1 or 2 correct = 1 mark
[2]
R nerve
R unspecified organs
(b) (part A)
cerebrum / cerebral hemispheres / frontal lobes / fore brain;
(Problem)
loss of voluntary movement / speech difficulties /
change in sensory perception / / learning difficulty / memory loss /
change in emotional behaviour;
(part B)
Cerebellum / hind brain;
(Problem)
loss of control over movement / loss of learnt activity /
loss of balance / coordination;

[max 4]
Require the effect of the damage.
Need the idea of "loss"
(c) (i) Mitosis; [1]
(ii) Tissue; [1]
(d) Y chromosome is only in males / female is XX;
injected cells have travelled to brain;
Replication / cell division has occurred / tissue has formed;
Cells present after time period;
[max 3]
[Total: 11]

M/J12/21/Q4

4 (a) rays continue parallel until hit cornea;
rays converge at cornea;
rays converge at lens;
meet before retina + continue to hit retina; [3]
(b) (i) narrows / decreases in size or diameter / constricts (R contracts); [1]
(ii) iris + muscles;
circular + contract; [2]
(c) (i) fast / rapid / quick;
reaction / response + (to) stimulus;
automatic / involuntary / no involvement of conscious thought AW; / cannot be controlled
R no involvement of brain [2]
(ii) too much light allowed to enter AW;
damage to retina / rods / cones / light-sensitive cells; [2]
[Total: 10]

M/J12/22/Q1

1 (a) (i) A pupil / aqueous humour / anterior chamber;
B cornea; [2]
(ii) dilates / gets big / enlarges / opens / gets wide / expands; [1]
(iii) Z on ciliary muscle / iris / external muscle; [1]
(b) reasonable ref. light receptors / sensitive cells / rods / cones;
not in contact with optic nerve;
no impulses;
to brain;
no picture formed / unable to see / blindness;
(R blurred vision or reduced visionary powers)
less / no nutrition for retina; [max. 3]
(c) failure to focus (all) light (rays);
blurred image AW;
any reference to the passage of light rays being impaired
(e.g. reflection / refraction / deflection / absorption / convergence);
ref. possible change in elasticity / ability to accommodate;
faded colour vision; [max. 3]

O/N11/22/Q3

3 (a) (i) H, E, I (or I, E), A, F, C all correct = 2, 3 in correct consecutive sequence =1 (Ignore any

other ‘E’s);; [2]
(ii) A, E, J, F, G, B (Ignore any other E’s); [1]
(iii) H, E, I (or I, E), A, F, C, D, G (B) (4 in correct consecutive sequence = 1) (Ignore any other ‘E’s) (which can include the final B);; [2]

(b) reflex / involuntary / unintentional (R spinal reflex);
voluntary / deliberate / intentional; [2]
(c) faster / fast v. slow;
electrical / impulses v. chemical / blood;
neurones v. blood / chemical;
(R nerves)
muscles v. glands / organs;
temporary AW v. more lasting AW;
sometimes deliberate AW v. less controlled AW;
specific organs v more general effect; [max 3]
[Total: 10]

M/J11/21/Q9

9 (a) impulses anywhere;
Accept specific examples for next 6 mps
(sensory) from sense organ/receptor;
to CNS/spinal cord/brain;
(relay) within CNS;
connecting sensory to motor neurones;
(motor) from CNS/spinal cord/brain;
to effector/muscle/gland; [max 5]
(b) sound + stimulus;
ears AW;
one correct reference to a neurone;
brain;
gland/adrenal/suprarenal;
adrenaline/epinephrine;
blood;
heart muscles;
ref. fight/flight/fright etc. response – or described; [max 5]
[Total: 10]

O/N10/21/Q7

7 (a) receptor or correct e.g.;
(converts) stimulus;
to impulse / electric pulse;
sensory + neurone / nerve fibre or cell;
synapse;
CNS / spinal cord (R brain);
(N.b. If brain directs the response i.e. any idea of a decision being made – stop marking)
relay neurone;
motor neurone;
flexor or named muscle;
effector; [max. 7]
(b) adrenaline;
in blood to heart;
defence mechanism / fright / prepare for action – or described;

(e.g. muscular action)
faster circulation of blood / faster delivery of O_2 or glucose; [max. 3]
[Total: 10]

O/N10/22/Q6

6 (a) chemical (R named hormone);
released / produced by a gland;
into blood;
target organ;
effect / alter the activity of;
destroyed by the liver; [max 4]
(b) *deviation from set point (or described);
(For insulin / ADH, set point must be ref. glucose / water in the blood)
named hormone
(for more than one hormone, mark the best account. R adrenaline / thyroxine);
named gland that produces it;
(R for any hormone that is not involved in homeostasis)
name of target organ;
effect (which must be homeostatic) correct for example;
*homeostasis;
*return to set point AW (A 'keeps constant', but R regulates / controls); [max 6]
(Need not refer to blood)
(*Only these marks available if hormone is incorrect.)

M/J10/21/Q7

7 (a) (cerebrum) conscious thought ;
memory ;
intelligence ;
learning ;
sight ;
speech ;
hearing ;
sensation (e.g. touch / taste / smell) ;
voluntary action (or named e.g. arm movement) ; [5 max]
(b) (cerebellum) the main centre of co-ordination / fine movement ;
posture / muscle tone ;
balance ;
instinct ; [2 max]
(c) ref. maintenance of constant internal environment / homeostasis ;
detects changes in* ;
any two from :
blood concentration, in (blood) temperature,
CO_2 concentration in blood, ;;
control of blood pressure ;
triggers appropriate response / AW* ; [3 max]
(* A controls / regulates for ONE mark)

O/N09/Q6

6 (a) chemical (R named hormone) ;
produced by a gland (R specific named endocrine gland) ;
carried + by the blood ;
affects a target organ (R specific target organ) ;
destroyed by liver ; [max 4]

Coordination and response P2 questions

(b) stimulus or example ;
receptor / or described (R named sense organs) ;
impulse / electrical pulse AW ;
sensory neurone or sensory nerve cell (R nerve) ;
correct ref. to CNS for action described ;
relay / intermediate neurone or nerve cell (A ‘interneurone’) ;
motor or effector neurone or nerve cell ;
effector or described (muscle or gland) ;
correct response for stimulus given / named reflex ; [max 6]
[Total: 10]

10. Homeostasis

Content

10.1 Structure and function of the skin

Learning outcomes

Candidates should be able to:

(a) define *homeostasis* as the maintenance of a constant internal environment

(b) explain the concept of control by negative feedback

(c) identify, on a diagram of the skin, hairs, sweat glands, temperature receptors, blood vessels and fatty tissue

(d) describe the maintenance of a constant body temperature in humans in terms of insulation and the role of temperature receptors in the skin, sweating, shivering, blood vessels near the skin surface and the coordinating role of the brain.

Homeostasis P2 QUESTIONS

M/J18/21/Q9

(a) Explain the concept of control by negative feedback.

.....

.....

.....

.....

.....

.....

.....

.....[4]

(b) Describe how **two named** components of the skin are involved in regulating body temperature in **hot** conditions.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[6]

[Total: 10]

Homeostasis P2 QUESTIONS

O/N17/21/Q9

(a) Describe how the nervous system is involved in the maintenance of a constant body temperature.

.....

.....

.....

.....

.....

.....

.....

.....

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.....

.....

.....[6]

Homeostasis P2 QUESTIONS

O/N17/22/Q2

Fig. 2.1 shows changes in the body temperature of a person.

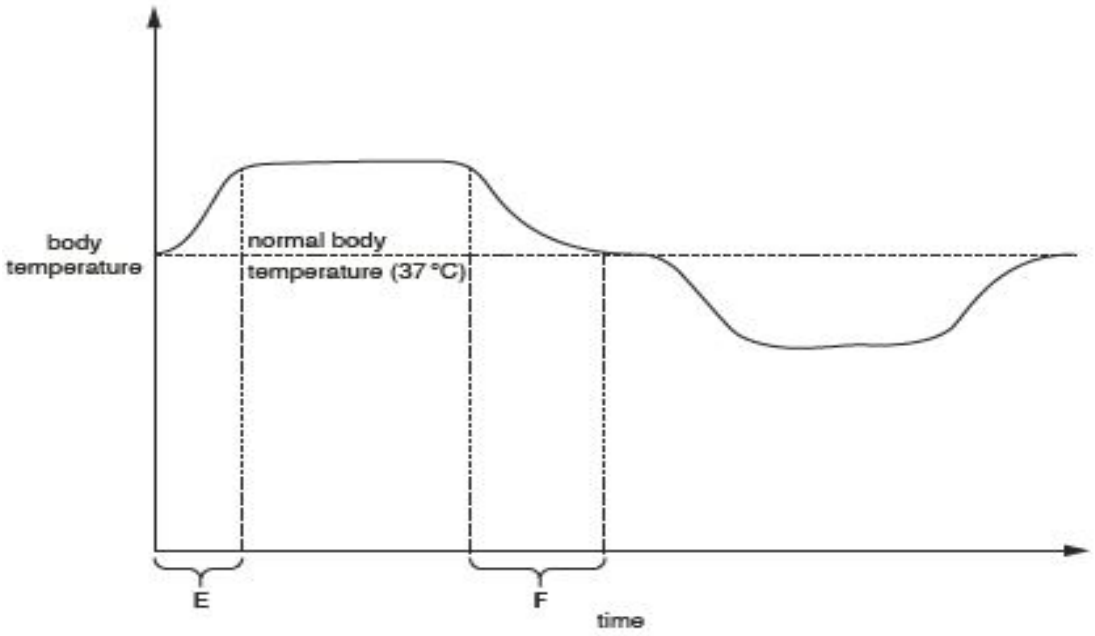


Fig. 2.1

(a) State the term for maintaining constant conditions, such as temperature, in the body.

.....[1]

(b) Suggest three things that could happen to account for the shape of the curve during time E.

1 .....

2 .....

3 .....

[3]

(c) Explain what is happening in the body to cause the change in body temperature at time F.

.....

.....

.....

.....

.....[3]

(d) Name each of the following:

(i) the process by which the return to a set point, as illustrated by Fig. 2.1, is achieved.

.....[1]

(ii) the part of the brain that controls this process.

.....[1]

[Total: 9]

M/J15/21/Q1

Fig. 1.1 shows a vertical section through the skin in two different environmental conditions, **A** and **B**.

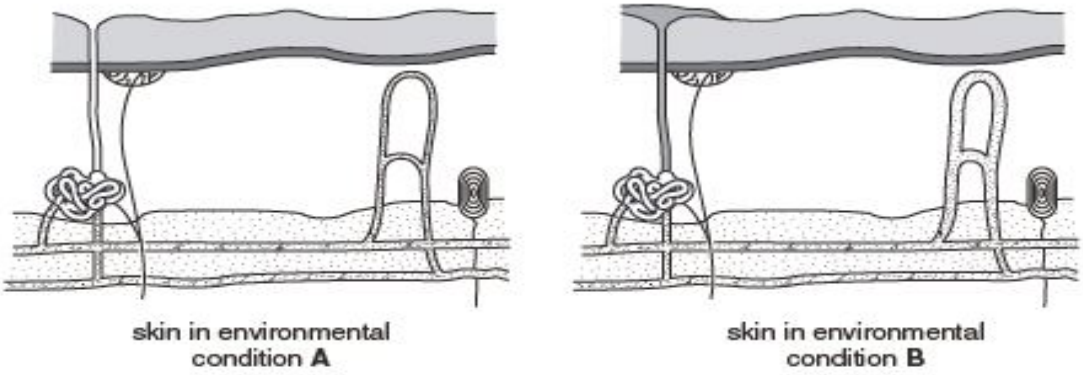


Fig. 1.1

(a) On Fig. 1.1, label each of the following:

- a sweat gland
- a capillary. [2]

(b) Use the information in Fig. 1.1 to suggest how environmental condition **B** is different from environmental condition **A**.

.....

..... [1]

(c) **(i)** State **two** differences between the skin in environmental condition **A** and the skin in environmental condition **B**.

1 .....

.....

2 .....

..... [2]

(ii) Explain the advantages to a person in environmental condition **B** of the **two** differences you have stated in your answer to **(c)(i)**.

.....

.....

.....

.....

.....

.....

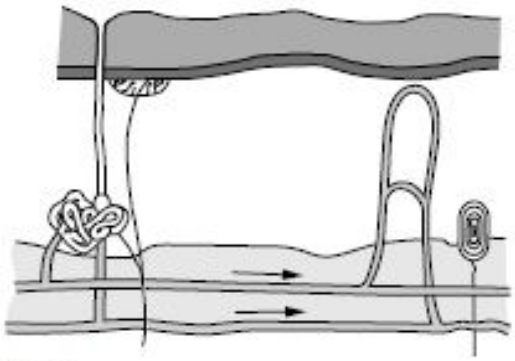
..... [3]

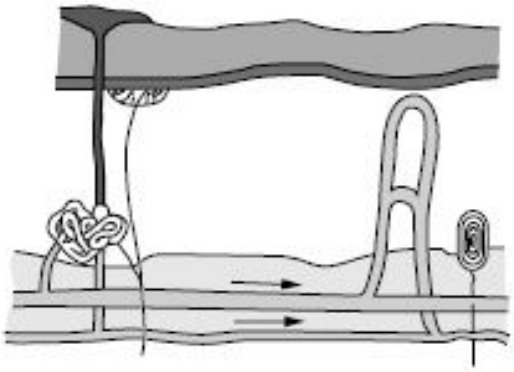
[Total: 8]

Homeostasis P2 QUESTIONS

O/N13/21/Q1

Fig. 1.1(a) and Fig. 1.1(b) show a section through the skin of a person at two different body temperatures.





Key

→ direction of blood flow

Fig. 1.1(a) **Fig. 1.1(b)**

(a) On Fig. 1.1(a), identify and label each of the following.

(i) a sweat gland

(ii) a temperature receptor. [2]

(b) **(i)** State what has happened to the body temperature to cause the changes shown in Fig. 1.1(b) compared with Fig. 1.1(a).

.....[1]

(ii) State **two** reasons for the answer you have given in **(b)(i)**.

1 .....

2 .....[2]

(c) **(i)** On Fig. 1.1(a), label and name the type of blood vessel that constricts when the body temperature falls. [2]

(ii) Explain the effects caused by constriction of the blood vessel you have named in **(c)(i)**.

.....

.....

.....

.....[4]

[Total: 11]

O/N13/22/Q6

(a) State the similarities between sweating and transpiration.

.....

.....

.....

.....[3]

(b) Describe the differences between sweating and transpiration.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[7]

[Total: 10]

O/N11/21/Q3

Fig. 3.1 shows a section through human skin.

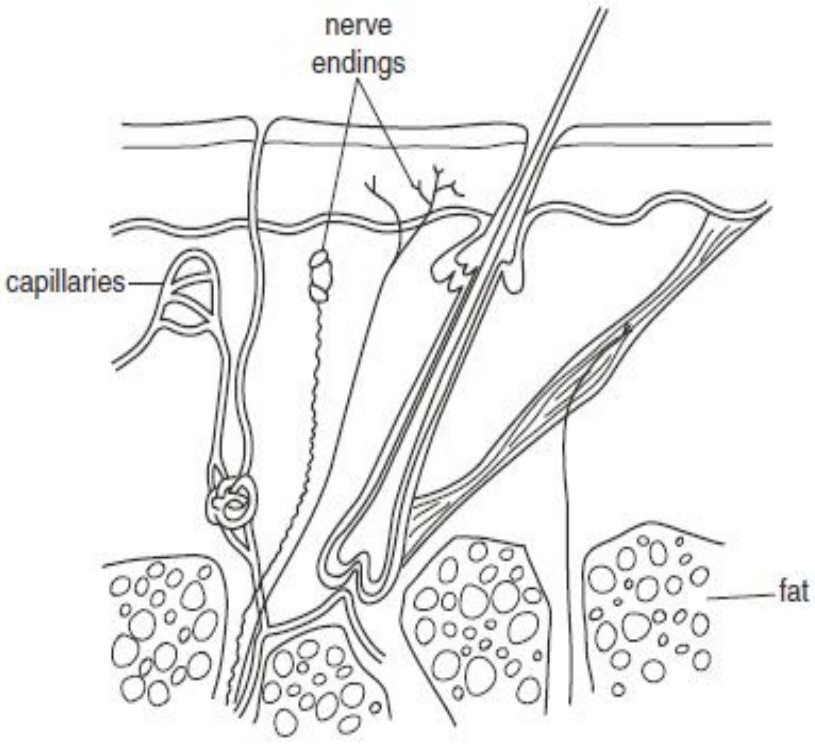


Fig. 3.1

(a) Suggest two possible functions of the nerve endings shown in Fig. 3.1.

1. .....

2. .....[2]

(b) Explain how the capillaries are involved in the loss of heat from the body during exercise.

.....

.....

.....

.....

.....

.....[3]

(c) Fig. 3.2 shows a yak. The yak is a large animal that lives at high altitudes (up to 5500 m).



Fig. 3.2

Suggest why

(I) the sweat glands of this animal are largely non-functional;

.....

.....

.....

.....[2]

(II) during those times of the year when food is plentiful, the yak stores a thick layer of fat beneath its skin;

.....

.....

.....

.....[2]

(III) the yak has a compact body with small ears and short tail.

.....

.....

.....

.....[2]

[Total: 11]

M/J10/22/Q4

Fig. 4.1 shows some structures in a section through human skin.

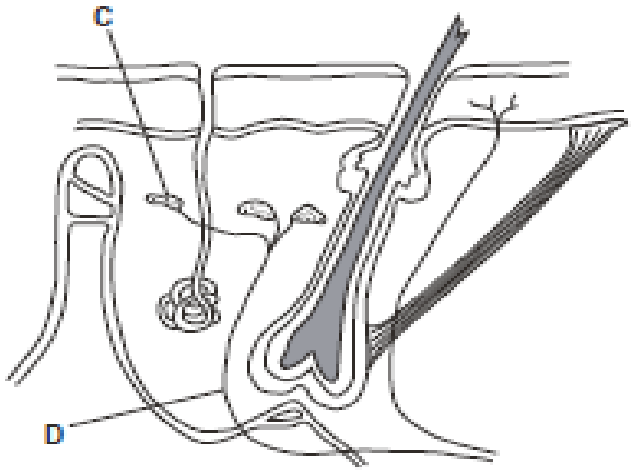


Fig. 4.1

(a) The body is able to maintain its internal environment within narrow limits. State the term for this process.

.....[1]

(b) Structures **C** and **D**, in Fig. 4.1, are involved in the process of temperature regulation.

Identify structures **C** and **D** and state the part they play in the process.

C .....

part played .....

.....

D .....

part played .....

.....[4]

(c) The consumption of alcohol causes the muscles in artery walls to relax.

Taking this into consideration, suggest why people who work in environmental temperatures below 5 °C might be advised not to drink alcohol before or during work.

.....

.....

.....

.....[3]

[Total: 8]

Mark schemes will use these abbreviations:
; separates marking points
/ alternatives
() contents of brackets are not required but should be implied
R reject
A accept (for answers correctly cued by the question, or guidance for examiners)
Ig ignore (for incorrect but irrelevant responses)
AW alternative wording (where responses vary more than usual)
AVP alternative valid point (where a greater than usual variety of responses is expected)
ORA or reverse argument
underline actual word underlined must be used by candidate
+ statements on both sides of the + are needed for that mark

M/J18/21/Q9

9(a) parameter / condition e.g. temperature **;**
change from set point / norm **AW ;**
detected **;**
reference to communication or named method (e.g.nerve / impulse / hormone) **;**
reference to control centre / coordinator / hypothalamus / brain **;**
response / corrective mechanism(s) **;**
reversal /correction of initial change / return to set point or norm **;**
4

9(b) any two from nerve ending / blood vessels / sweat gland / hair **;; 2**
(nerve ending)
detects / receptor **;**
change / increase in temperature **;**
impulse / (message) to brain **;**
(blood vessels)
dilate **;**
more blood to surface of skin **;**
reference to capillaries **;**
reference to increased radiation / heat loss **;**
(sweat gland / duct)
secretion / release / skin surface **+** sweat **;**
reference to evaporation **;**
(hair)
lowers **;**
less air trapped / loss of insulation **;**
4
A if with reference to capillaries

O/N17/21/Q9

9(a) hypothalamus **;**
reference to detecting blood temperature **;**

receptors **;**
in skin **;**
detect temperature **+** of surroundings **AW ;**
impulse **;**
sensory neurone **;**
to central nervous system / brain / spinal cord **;**
motor neurone **;**
effector **;**
named effector **;**
shiver / vasoconstriction or vasodilation / sweat increase or decrease **;**
reference to negative feedback **;**
6
A muscle or named effector / sweat gland

O/N17/22/Q2

2(a) homeostasis **; 1**
2(b) **1** body temperature increased **;**
2 exercise **AW ;**
3 increased / high **+** surrounding **AW** temperature **;**
4 increased / high **+** surrounding **AW** humidity **;**
5 hot **+** food / drink **;**
6 increased / high **+** metabolism / respiration **;**
7 fever / illness **;**
8 ovulation **;**
9 wear more clothes **AW ;**
3
2(c) **1** sweat **;**
2 evaporation **;**
3 vasodilation **AW ;**
4 reduced **+** metabolism / respiration **;**
5 more blood **+** to skin **;**
6 heat loss / radiation **;**
3
2(d)(i) negative feedback **; 1**
2(d)(ii) hypothalamus **; 1**

M/J15/21/Q1

1 (a) (i) sweat gland labelled ;
capillary labelled ;
R sweat duct [2]
(b) warmer ; must be a comparative statement [1]
(c) (i) sweat (present in B / ORA) ;

capillaries carry more blood (in
B / ORA) ;
capillaries wider / dilated (in B / ORA) ;
Ig constrict / shrink
[max 2]
(ii) evaporation (of sweat) ;
more blood near (surface of) skin ;
increased heat loss / cooling ;
allows regulation of temperature /
prevents overheating ;
[max 3]

M/J14/21/Q6

6 (a) maintenance of / constant ;
internal environment / conditions within the body ;
[2] A regulating / control
Ig specific examples
(b) (i) low temperature detected ;
by receptors / sensors on skin ;
brain ;
any two corrective mechanisms from
shivering / hairs raised / sweating reduced/stopped /
vasoconstriction of blood vessels (R of capillaries) ;;
temperature rises again ;
[4]
A hypothalamus
(ii)
(colon) water absorbed into blood ;
rise / excess (in water content of blood) detected ;
excess water excreted / removed / more urine produced AW ;
by kidney ;
correct ref. ureter / bladder / urethra in correct context ;
[4]
A ref. hypothalamus A correct ref. to ADH
A nephron
Total [10]

O/N13/21/Q1

(a) (i) label line must touch the sweat gland;
[1]
A label on gland or duct
A (i) = gland
(ii) label line must touch some part of receptor under
Malpighian layer;
[1]
(ii) = temp receptor
(b) (i) (temperature / it) increases / rises; [1] R cooler / decreases OWTTE

(ii) In either order:
sweat;
wider blood vessels / capillaries / more blood;
[2]
R veins
(c) (i) arteriole;
the upper horizontal blood vessel labelled;
[2]
A Artery
(the word – ignore what is labelled)
(ignore name given to it)
(ii) less blood (flows);
to capillaries (R capillaries constrict)
to sweat glands;
blood carries heat / less heat carried
less heat lost by skin / radiation ;
less sweat produced;
ref to latent heat of vaporisation;
[max 4]
A less heat lost by blood
[Total 11]

O/N13/22/Q6

6 (a) loss of water;
involves evaporation / as vapour;
to the atmosphere / surroundings;
cooling effect;
through pores AW;
in epidermis;
both affected by temp / humidity / wind (speed); [max 3]
(b) (Accept reverse arguments where relevant)
occurs in animals;
sweating ref. (loss of) urea / ions / salts / minerals;
under nervous control;
ref. homeostasis / determined by body temperature;
(sweat) glands / ducts;
sweat extracted from blood;
(from) skin;
transpiration from leaves / stems;
(helps to) bring ions up stem/xylem / to leaves/cells;
(helps to) bring water up stem/xylem / to leaves/cells;
consequence of stomata open for photosynthesis; [max 7]
[Total 10]

O/N11/21/Q3

3 (a) one per line, mark the first, any 2 from:
detection of pressure, temperature, pain, touch;; [2]
(A for ONE mark max. a reference to the detection of stimuli)

(b) dilation;
more blood;
blood carries heat;
heat lost from + body surface/skin/named heat transfer method;

capillaries supply sweat glands; [max 3]
(c) (i) (A reverse argument) very little sweat lost;
no need to sweat/sweating would be detrimental AW;
fur would inhibit evaporation;
less heat lost;
*ref. low external temperature; [max 2]
(ii) stores energy;
supplies energy/heat;
insulates (against heat loss);
*ref. low external temperature; [max 2]
(iii) (A reverse argument)
(for ears/tail) reduced surface/small surface area;
ref. small surface area to volume ratio for the whole animal (Assume that 'it' = the yak);
from which heat can be lost;
*ref. low external temperature; [max 2]
(n.b. * = once only)
[Total: 11]

M/J10/22/Q4

(a) homeostasis ; [1]
(b) C – receptor / sensor ;
detecting changes (in temperature) (A even if misidentified) ;
D – sensory / afferent + neurone / nerve cell or fibre (R nerve) ;
impulses to CNS / brain / spinal cord / (A even if misidentified) ; [4]
(c) more blood ;
to capillaries ;
(vaso)dilate (A with ref. to capillaries or arteri(ol)es) ;
blood carries heat ;
more heat lost ;
lowers body temperature (still) further / hypothermia / AW ; [3 max]

1. Fig. 2.1 shows a section through the eye with a ray of light passing through it and four muscles labelled **A**, **B**, **C** and **D**.

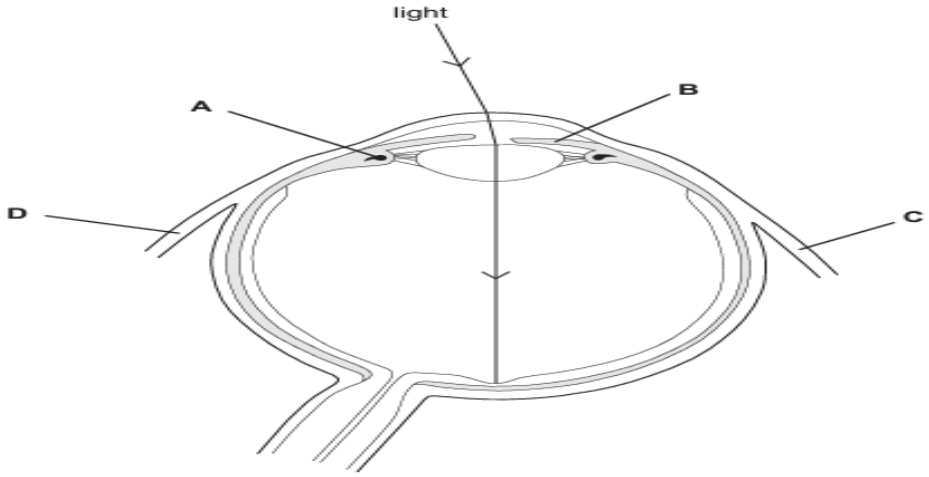


Fig. 2.1

(a) Complete the table.

part	name of muscle	effect of contraction
A	.....	allows the lens to become fatter for focusing on close objects
B	iris circular muscle	....

[2]

Muscles **C** and **D** are voluntary muscles that are antagonistic. They are attached to the eye socket of the skull.

(b) **(i)** Explain the terms *voluntary* and *antagonistic*.

voluntary .....

.....

antagonistic .....

..... [2]

(ii) Suggest the effect on the eye when muscle **C** contracts.

.....

..... [1]

(iii) Explain how the eye would return to its original position after this contraction.

.....

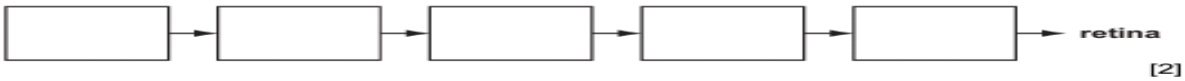
.....

..... [2]

(c) Light passes through parts of the eye to reach the retina.

Complete the flow chart by putting the following terms in the boxes to show the correct order that the light passes through them.

aqueous humour **cornea** **lens** **pupil** **vitreous humour**



[2]

(d) The retina contains rods and cones.

Complete the table to distinguish between rods and cones.

	type of light detected	distribution in the retina
rods	.....	....
cones	.....	....

[4]

[Total: 13]

2. Ahmed entered a very dark room. His irises responded by changing the pupil size and gradually he could see shapes of objects in the room. Dust in the air made him sneeze. Suddenly the door slammed shut, causing his heart beat to speed up. He switched on the light to find the door and he grabbed the door handle……

(a) Complete the table by stating two voluntary actions and two involuntary actions described in the text above.

voluntary actions	involuntary actions
1.	1. ....
2.	2. ....

[4]

(b) Actions are caused by the stimulation of effectors.

(i) Name the two different types of effector in the body.

1. .....

2. ..... [2]

(ii) State the type of neurone that stimulates effectors.

..... [1]

(c) Plants also respond to stimuli such as light.

(i) State the name of the response of plants to light.

..... [1]

Ahmed was provided with several young plant shoots and a sample of auxin.

(ii) Describe an experiment he could carry out to show that auxin causes bending of a shoot.

.....

.....

.....

.....

.....

.....

..... [4]

(iii) Explain the mechanism that results in a shoot bending towards light.

.....

.....

.....

.....

..... [3]

(d) Synthetic plant hormones behave in a similar way to auxins. Describe how synthetic plant hormones are effective as weedkillers.

.....

.....

..... [2]

[Total: 17]

3 Fig. 3.1 shows a female lion in a game reserve.



Fig. 3.1

(a) (i) State **one** feature, visible in Fig. 3.1, which identifies the lion as a mammal.

.....

.....

[1]

(ii) State **one** other feature, **not** visible in Fig. 3.1, which distinguishes mammals from all other vertebrate groups.

.....

.....

[1]

(b) Study the eyes of the lion in Fig. 3.1.

(i) Suggest and explain what the light conditions were when the photograph was taken.

light conditions .....

explanation .....

.....

.....

[2]

(ii) Explain the importance of the eyes reacting to light in this way.

.....

.....

.....

[2]

(c) Scientists say that lions are unable to see in colour.

Suggest how a study of a lion's retina would provide evidence for this statement.

.....

.....

.....

[1]

(d) The lion in Fig. 3.1 was observing tourists nearby. It turned its head to see zebras moving in the distance.

Describe how the eyes of the lion would adjust to focus on the zebras.

.....

.....

.....

.....

.....

[3]

(e) The lion was photographed in a game reserve in Namibia.

Explain why the conservation of animals in game reserves is important.

.....

.....

.....

.....

.....

[3]

[Total:13]

4. **(a)** Define the terms *sensitivity* and *involuntary action*.

sensitivity .....

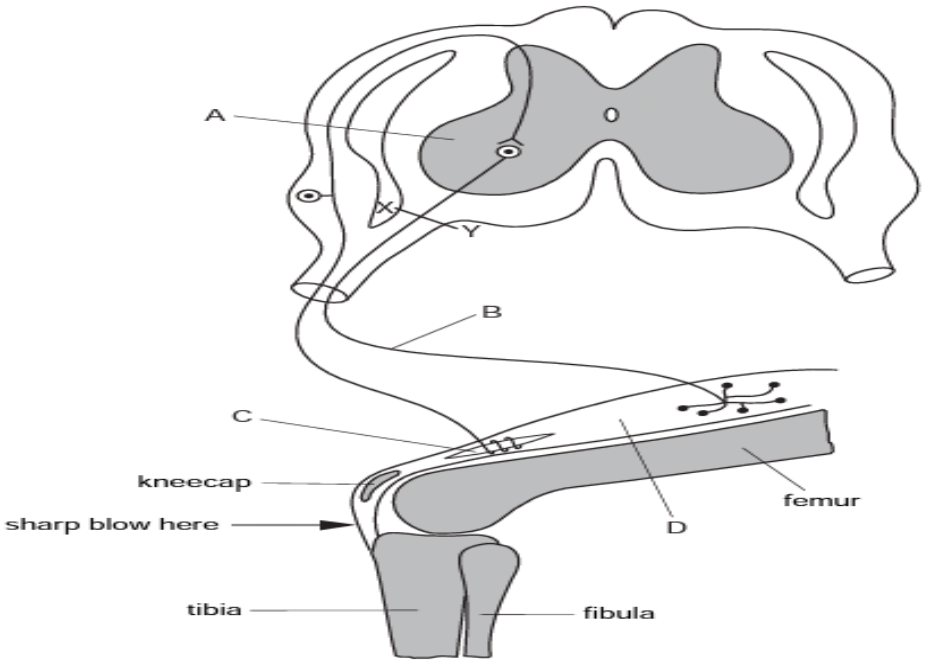
.....

involuntary action .....

.....

..... [3]

Fig. 1.1 shows the reflex arc for the knee jerk reflex.



(b) **(i)** Name parts **A** to **D**.

A .....

B .....

C .....

D ..... [4]

(ii) Nerve cells use active transport to move ions across their cell membranes.

Explain what is meant by the term *active transport*.

.....

.....

.....

..... [2]

(c) Explain what would happen to the reflex shown in Fig. 1.1 if the nerve was cut across at **X**-**Y**.

.....

.....

.....

.....

.....

.....

..... [3]

(d) Fig. 1.2 shows the grasping reflex of a baby.



Fig. 1.2

Suggest why it is a good idea to test a baby's reflexes immediately after birth.

.....

..... [1]

[Total: 13]

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5. The light sensitive cells in the eye are known as rods and cones.

Fig. 2.1 shows drawings of a rod cell and a cone cell.

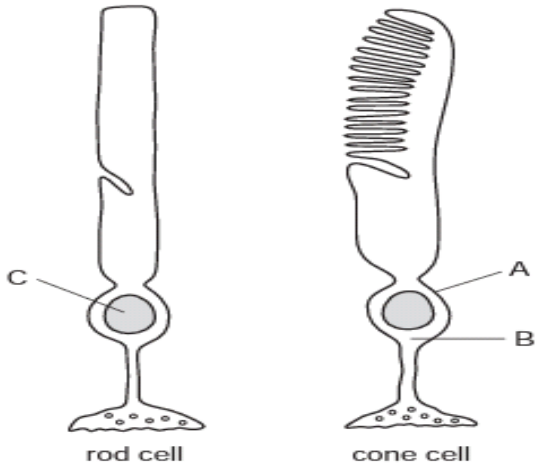


Fig. 2.1

(a) Name the structures labelled **A** to **C**.

A .....

B .....

C ..... [3]

(b) **(i)** Name the tissue in the eye where rods and cones are found.

..... [1]

(ii) Name the parts of this tissue where there are

cones but no rods .....

no cones or rods ..... [2]

(c) Describe how rods and cones function.

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 10]

6. Fig. 3.1 shows the front part of the eye.

The eye shown in Fig. 3.1 is **far adapted**, which means that the lens is focusing light from a distance.

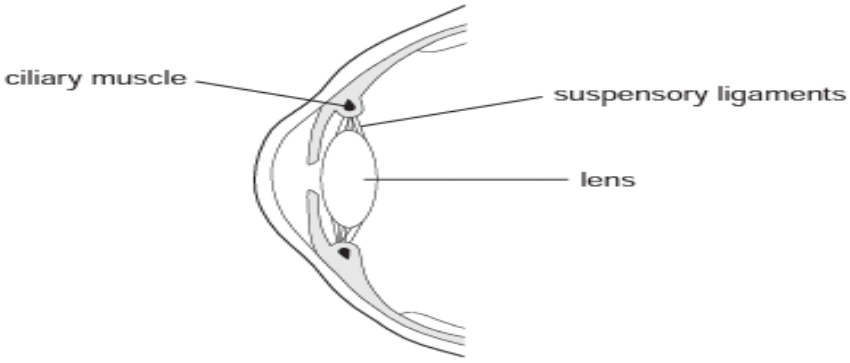


Fig. 3.1

The lens changes shape to alter the direction of light rays passing through the eye.

(a) Name:

(i) another part of the eye that also alters the direction of the light rays;

..... [1]

(ii) the part of the eye where the light rays form an image.

..... [1]

(b) An eye specialist measured the change in shape of the lens of a patient during an eye test. The specialist recorded the change in shape of the lens with the patient looking at a chart 10 metres away and when reading from a book. This is shown in Fig. 3.2.

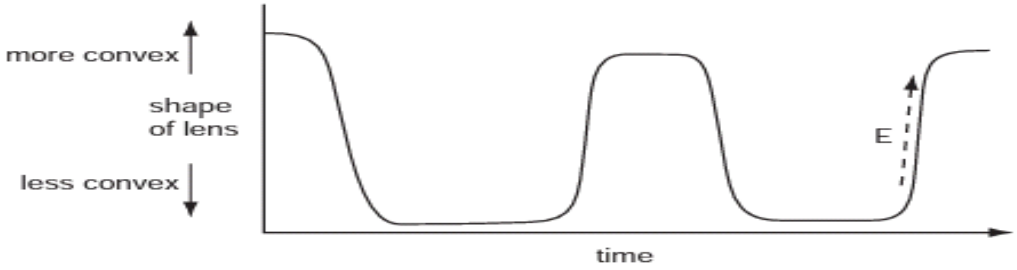


Fig. 3.2

(i) Write the letter **D** on Fig. 3.2 to show a time when the patient was looking at the chart that was 10 metres away. [1]

(ii) State how the ciliary muscles and suspensory ligaments act to change the shape of the lens during the time marked **E** on Fig. 3.2.

ciliary muscles .....

.....

suspensory ligaments .....

..... [2]

(c) Outline how humans are able to see in colour.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 8]

7. **(a)** Define the term *sensitivity*.

.....

.....

.....

.....[2]

(b) Describe how voluntary actions differ from involuntary actions.

.....

.....

.....

.....

.....[2]

(c) Name the neurone that transmits impulses from a receptor.

.....[1]

(d) Reaction time is defined as the time taken to respond to a stimulus.

During a swimming relay race, the reaction times of four swimmers in two teams, **A** and **B**, were recorded.

In each team, swimmer 1 responded to the sound of the start gun; swimmers 2, 3 and 4 responded to seeing the previous swimmer touch the swimming pool wall.

Table 3.1 shows the reaction times for the swimming relay teams.

Table 3.1

swimmer	reaction time / s	
	team **A**	team **B**
1	0.81	0.75
2	0.48	0.40
3	0.58	0.06
4	0.31	0.35

Compare the reaction time of swimmer 1 in each team with the reaction times of the other swimmers in each team. Use the information in Table 3.1 to support your answer.

.....

.....

.....

.....

.....

.....

.....[3]

(e) Adrenaline is often secreted during sporting competitions.

Outline how adrenaline affects the performance of a swimmer.

.....

.....

.....

.....

.....

.....

.....[3]

[Total: 11]

8. Jasmine went into a dark room from a bright corridor.

(a) Fig. 4.1 represents Jasmine's right eye before and after entering the dark room.



before entering

a few seconds after entering

Fig. 4.1

(i) Complete Fig. 4.1 by **drawing** the appearance of the pupil and iris

1. before entering the dark room, [1]

2. a few seconds after entering the dark room. [1]

(ii) Label the following parts of the eye on the first diagram in Fig. 4.1.

iris **pupil** **sclera** [3]

(b) Explain how the size of the pupil was changed when Jasmine went into the dark room.

.....

.....

..... [2]

(c) Explain why Jasmine could see shapes but **not** colours in the dark room.

.....

.....

.....

..... [3]

[Total: 10]

9. Fig. 2.1 shows a reflex arc involving a finger and a muscle in the arm.

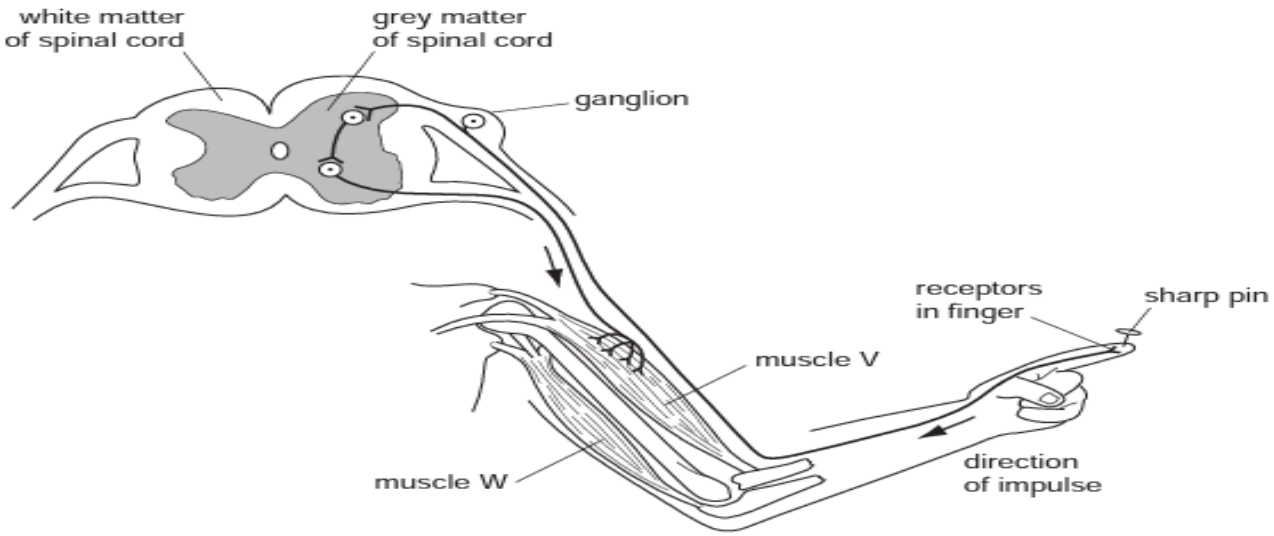


Fig. 2.1

(a) State two stimuli that can be detected by receptors in the finger.

1. .....

2. ..... [2]

(b) Using labels from Fig. 2.1, state the site of the cell body of

1. a sensory neurone, ...

2. a relay neurone. ..... [2]

(c) (i) In what form are impulses transmitted in the nervous system?

.....[1]

(ii) State the structure, present in many mammalian neurones, which reduces leakage of the impulse.

.....[1]

(iii) The impulse takes 0.02 seconds to pass from the finger to the spinal cord, a distance of 1.5 metres. Calculate the speed of the impulse. Show your working.

Speed ..... [2]

(iv) Although the total distance the impulse travels in the reflex arc is less than 3 metres, the time taken is more than 0.04 seconds. Suggest why the time taken is more than expected.

.....

.....[1]

(d) (i) Describe what would happen to the muscle and the arm when muscle **V** receives the nerve impulse.

.....

.....

.....[2]

(ii) Explain how muscle **V** would return to its original position.

.....

.....

.....[2]

[Total: 13]

10. **(a)** Define the term *sensitivity*.

.....

.....

.....

.....[2]

Fig. 2.1 shows the reflex arc involved in a simple reflex action.

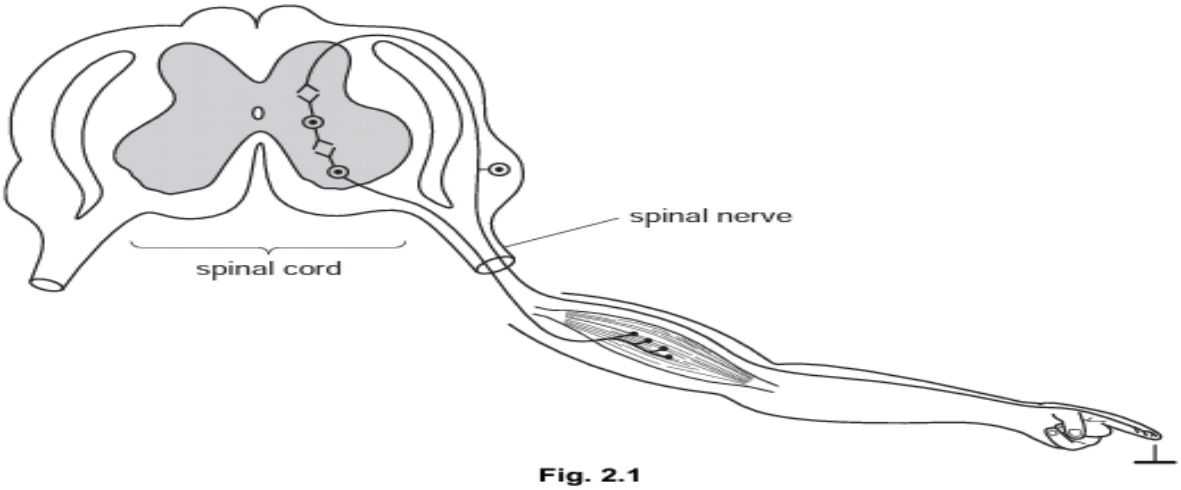


Fig. 2.1

(b) On Fig. 2.1 use label lines and the following letters to show

F a receptor in the skin

G the neurone that transmits impulses to the spinal cord

H the effector in this reflex arc. [3]

(i) Explain what is meant by the term *involuntary action*.

.....

.....

.....

.....

..... [2]

(ii) The arm shown in Fig. 5.1 moves in response to the detection of heat.

Explain how the parts of the reflex arc shown in Fig. 5.1 bring about this response.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

(iii) Describe the advantages of simple reflexes, such as the one shown in Fig. 5.1.

.....

.....

.....

.....

..... [2]

(c) The organs of the human body are coordinated by the nervous system.

Outline **one** other way in which these organs are coordinated.

.....

.....

.....

.....

..... [2]

[Total: 14]

11. **(a)** Define the term *sensitivity*.

.....

.....

.....

..... [2]

Fig. 1.1 shows a horizontal section through the eye.

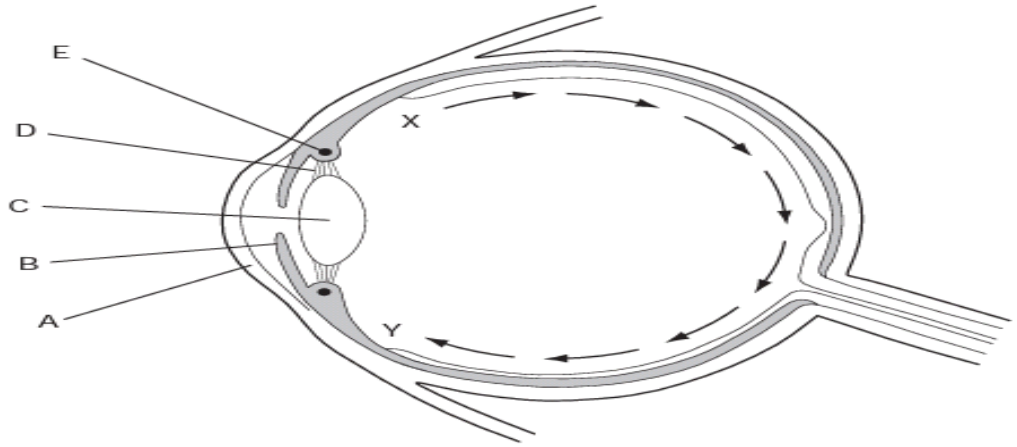


Fig. 1.1

(b) (i) Name structures **A** to **D**.

A .....

B .....

C .....

D ..... [4]

(ii) State the functions of structures **B** and **E**.

B .....

E ..... [2]

The retina contains light-sensitive cells known as rods and cones. The distribution of rods in the retina from point **X** to point **Y**, as shown on Fig. 1.1, was investigated.

Fig. 1.2 shows the distribution of rods in the retina from point **X** to point **Y**.

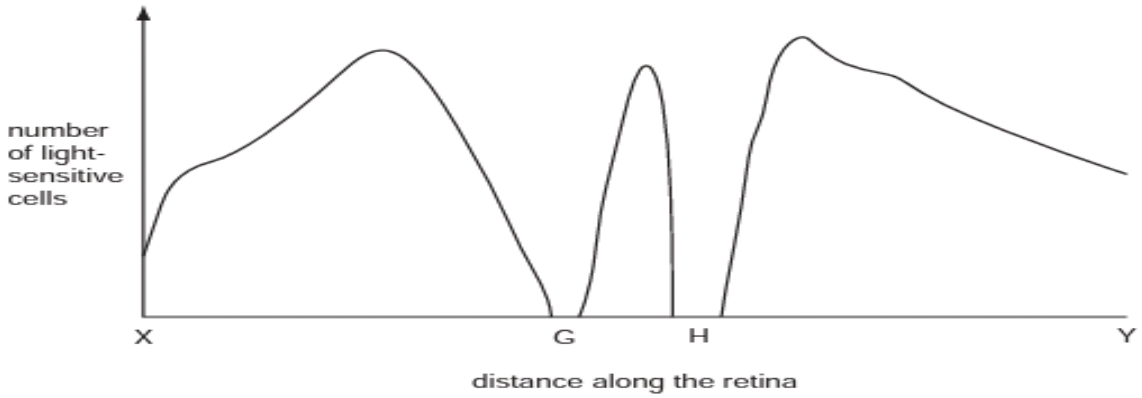


Fig. 1.2

(c) (i) **G** and **H**, as shown on Fig. 1.2, are parts of the retina.

Name **G** and **H**.

G .....

H ..... [2]

(ii) Describe the function of the rods.

.....

.....

.....

..... [2]

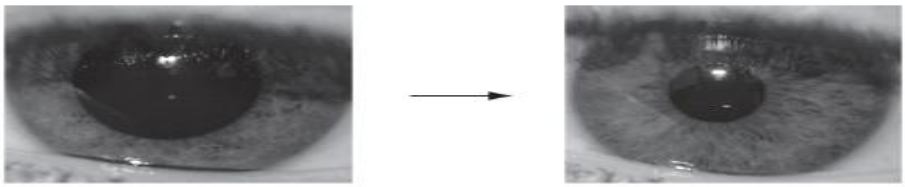
(iii) Draw a line on Fig. 1.2 to show the distribution of cones in the retina. [2]

[Total: 14]

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12. **(a)** Fig. 2.1 shows a reflex action that involves the eye.

A shows an eye in dim light. **B** shows the same eye when a bright blue light is shone into it.



A bright blue light B

Fig. 2.1

(i) Identify the:

- stimulus to which the eye responds;
- receptor cells that detect the stimulus;
- effector;
- response that the eye makes.

Write your answers in Table 2.1.

Table 2.1

stimulus	
receptor cells	
effector	
response	

[4]

(ii) Describe how the nervous system coordinates the response shown in Fig. 2.1.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(b) Adrenaline is secreted by the adrenal glands to prepare the body for dangerous situations.

Extreme sports, such as bungee jumping shown in Fig. 2.2, are an example of such a dangerous situation.



Fig. 2.2

Explain how adrenaline prepares the body for an extreme sport, such as making a bungee jump.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

(c) The response shown in Fig. 2.1 is involuntary.

Bungee jumping is a voluntary action.

Describe **two** ways in which involuntary actions differ from voluntary actions.

.....

.....

.....

.....

..... [2]

[Total: 15]

13. Fig. 2.1 shows a nerve cell.

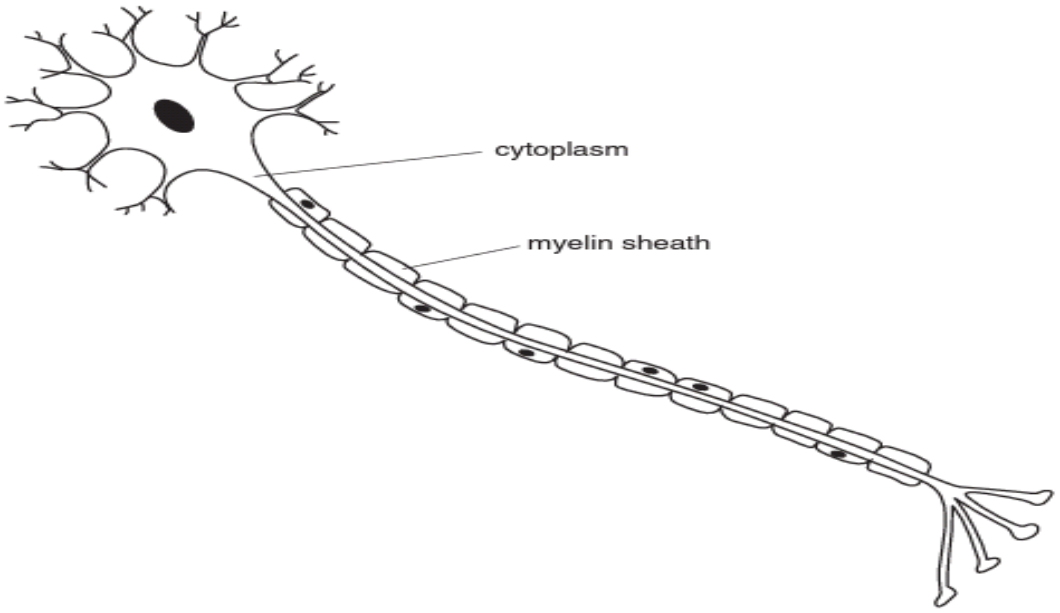


Fig. 2.1

(a) (i) Name the type of nerve cell shown in Fig. 2.1.

.....[1]

(ii) State two features that distinguish it from other types of nerve cell.

1. .....

2. .....[2]

(iii) Where, in the nervous system, is this cell located?

.....[1]

(b) Nerve cells are specialised cells.

Suggest how the parts of the nerve cell labelled in Fig. 2.1 enable the nerve cell to function successfully.

cytoplasm .....

.....

myelin sheath .....

.....[4]

(c) Reflexes involve a response to a stimulus.

(i) Complete the flow chart by putting the following terms in the boxes to show the correct sequence in a reflex.

coordinator **effector** **receptor** **response** **stimulus**



[2]

(ii) For the pupil reflex, identify each of the parts of the sequence by completing Table 2.1. The first has been done for you.

Table 2.1

part of sequence	part in pupil reflex
coordinator	brain
effector	
receptor	
response	
stimulus	

[4]

[Total : 14]