

(The human nervous system (CNS, reflex arc, required practical))

Q1.(2018)

Many human actions are reflexes.

Which **two** of the following are examples of reflex actions?

[2 marks]

Tick **two** boxes.

Jumping in the air to catch a ball

☐

Raising a hand to protect the eyes in bright light

☐

Releasing saliva when food enters the mouth

☐

Running away from danger

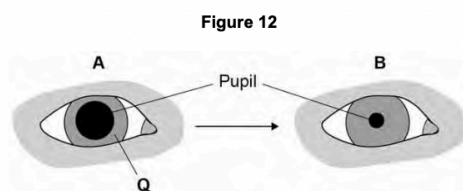
☐

Withdrawing the hand from a sharp object

☐

Q2.a)(2018)

Figure 12 shows how the size of the pupil of the human eye can change by reflex action.



Name **one** stimulus that would cause the pupil to change in size from **A** to **B**, as shown in **Figure 12**.

[1 mark]

Q2.b)(2018)

Structure **Q** causes the change in size of the pupil.

Name structure **Q**.

[1 mark]

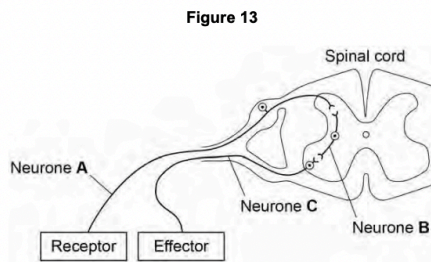
Q2.c)(2018)

Describe how structure **Q** causes the change in the size of the pupil from **A** to **B**.

[1 mark]

Q3.(2018)

Figure 13 shows some structures involved in the coordination of a reflex action.



Describe how the structures shown in Figure 13 help to coordinate a reflex action.

[6 marks]

Q4.(2019)

The nervous system allows a person to detect stimuli.

Draw **one** line from each stimulus to the sense organ that detects the stimulus.

[2 marks]

Stimulus	Sense organ
Chemicals	Ear
Light	Eye
	Tongue

Q5.(2019)

Moving a hand away from a hot object is an example of a reflex action.

What is a reflex action?

[2 marks]

Q6.(2019)

A muscle in the arm moves the hand away from the hot object.

How does the arm muscle do this?

[1 mark]

Tick (✓) **one** box.

The muscle contracts.

☐

The muscle expands.

☐

The muscle relaxes.

☐

The muscle shrinks.

☐

Q7.a)(2019)

Two students investigated the effect of drinking coffee on reaction time.

This is the method used.

1. Student **A** holds a metre rule just above student **B**'s hand, as shown in **Figure 1**.
2. Student **A** lets go of the metre rule.
3. Student **B** catches the metre rule as quickly as possible.
4. Student **A** writes down the reading from the scale on the metre rule.
5. Students **A** and **B** repeat steps 1–4 another four times.
6. Student **B** then drinks a cup of coffee.
7. After 15 minutes, students **A** and **B** repeat steps 1–5.

Figure 1

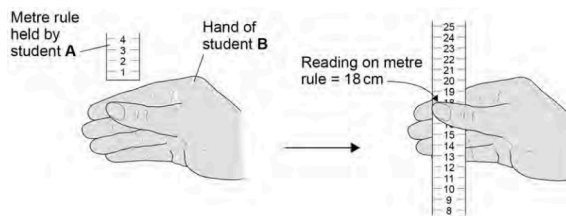


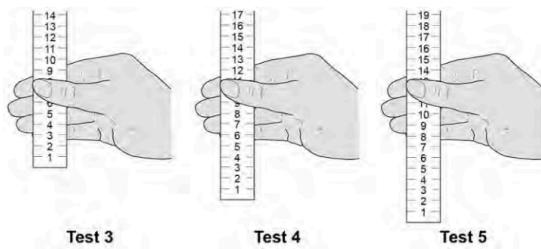
Table 1 shows some of the results.

Table 1

Test	Reading from scale on metre rule in cm	
	Before drinking coffee	After drinking coffee
1	18	10
2	21	14
3	15	
4	12	
5	19	

Figure 2 shows the results **after** drinking the coffee for tests 3, 4 and 5.

Figure 2



Complete Table 1.

Use results from Figure 2.

[2 marks]

Q7.b)(2019)

The students made the following conclusion:

'Drinking coffee speeds up reactions.'

Give evidence from Table 1 to support the students' conclusion.

[1 mark]

Q7.c)(2019)

The students' conclusion may **not** be valid.

Suggest **two** improvements the students could make to their method.

[2 marks]

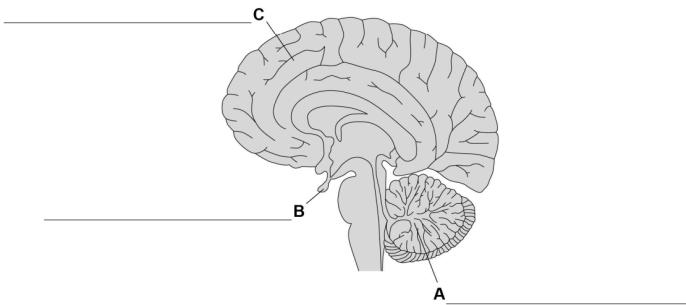
1

2

Q8.(2020)

Figure 6 shows the brain.

Figure 6



Label **A**, **B** and **C** on **Figure 6**.

[3 marks]

Choose answers from the box.

cerebellum	cerebral cortex	medulla	pituitary gland
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Q9.(2020)

Which part of the brain controls balance when riding a bicycle?

[1 mark]

Tick (✓) **one** box.

Cerebellum

☐

Medulla

☐

Pituitary gland

☐

Q10.(2020)

The ears send information about sound to the brain.

Which word describes the brain?

[1 mark]

Tick (✓) **one** box.

Coordinator

☐

Effector

☐

Receptor

☐

Stimulus

☐

Q11.(2020)

What type of cell carries impulses from the ears to the brain?

[1 mark]

Q12.(2020)

Human eyes detect light.

Which part of the eye has cells that detect light?

[1 mark]

Tick (✓) **one** box.

Iris

☐

Lens

☐

Retina

☐

Q13.a)(2020)

Figure 7 shows a student reading a book.

Figure 7



There are trees on the far side of the field.

The student looks at the trees instead of looking at the book.

What process occurs in the eye when the student looks at the trees instead of looking at the book?

[1 mark]

Tick (✓) **one** box.

Accommodation

☐

Magnification

☐

Reflection

☐

Q13.b)(2020)

What change happens in the student's eyes when they look up at the trees?

[1 mark]

Tick (✓) **one** box.

Light rays are refracted less

☐

More light is reflected

☐

The optic nerves move

☐

Q13.c)(2020)

The student **cannot** see the trees in focus.

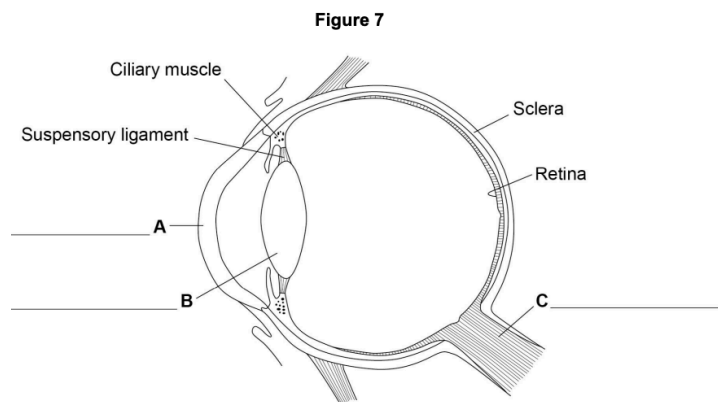
Name the common defect of the eye which causes distant objects to appear out of focus.

[1 mark]

Q14.a)(2021)

The human eye can form images of objects that are at different distances away from the eye.

Figure 7 is a diagram of the eye.



Label structures **A**, **B** and **C** on **Figure 7**.

[3 marks]

Choose answers from the box.

cornea	eyelid	iris	lens	optic nerve
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Q14.b)(2021)

Homeostasis and Response

<http://www.pcfgstudy.com>

The eye in **Figure 7** is focused on a distant object.

If the eye then focuses on the words in a book, changes would occur in the eye.

The light rays would be refracted more by the lens.

How does the lens refract the light more?

[1 mark]

Tick (✓) **one** box.

By becoming longer

☐

By becoming thicker

☐

By becoming transparent

☐

Q14.c)(2021)

Which **two** structures control the shape of the lens?

[2 marks]

Tick (✓) **two** boxes.

Ciliary muscles

☐

Cornea

☐

Iris

☐

Sclera

☐

Suspensory ligaments

☐

Q15.(2021)

To form a clear image, the light rays entering the eye must focus on one structure in the eye.

Name the structure.

[1 mark]

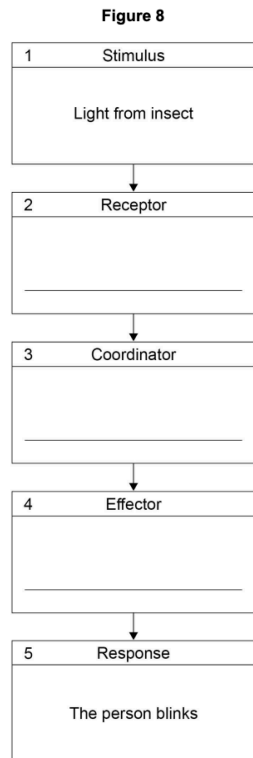
Q16.(2021)

Homeostasis and Response

<http://www.pcfgstudy.com>

An insect flies near a person's eye. The person blinks.
This is a reflex action.

Figure 8 shows the coordination system for this reflex action.



Complete Figure 8.

[2 marks]

Choose answers from the box below.

Write **one** word in each of boxes 2, 3 and 4 of Figure 8.

brain	cornea	iris	muscles	retina
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Q17.(2022)

Many human actions are reflexes.

Which statement describes a reflex action?

[1 mark]

Tick (✓) **one** box.

A reflex action does not need a sense organ.

☐

A reflex action is a slow action.

☐

A reflex action is automatic.

☐

Q18.a)(2022)

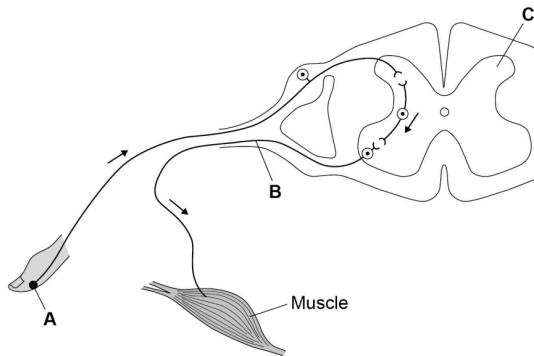
Homeostasis and Response

<http://www.pcfgstudy.com>

Figure 3 shows the nerve pathway for a reflex action.

The arrows show the direction of the nerve impulse.

Figure 3



Draw **one** line from each part of the nerve pathway to the name of that part.

Use **Figure 3**.

[3 marks]

Part of nerve pathway

Name of part

A

Motor neurone

B

Receptor

C

Relay neurone

Spinal cord

Q18.b)(2022)

Which **two** human actions are reflexes?

[2 marks]

Tick (✓) **two** boxes.

Blinking when an insect flies into the eye

☐

Catching a ball in a playground game

☐

Playing a musical instrument

☐

Removing the hand from a hot object

☐

Writing a message to a friend

☐

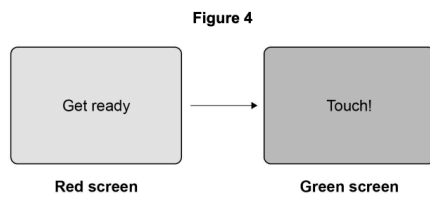
Q19.a)(2022)

Homeostasis and Response

<http://www.pcfgstudy.com>

Students investigated their reaction times using a computer program.

Figure 4 shows a sequence of two screens in the computer program.



This is the method used.

1. Open the reaction time program.
2. When the screen turns from red to green, touch the screen as quickly as possible.
3. Record the reaction time shown on the screen.
4. Re-set to the red screen.
5. Repeat steps 2 to 4 four more times.
6. Repeat steps 1 to 5 for each student.

Table 1 shows the results.

Table 1

Test	Reaction time in milliseconds			
	Student P	Student Q	Student R	Student S
1	317	310	367	320
2	309	293	352	304
3	290	312	350	315
4	333	307	359	308
5	328	312	635	313
Mean	315	307	357	X

Calculate mean value X in Table 1.

[2 marks]

X = _____ milliseconds

Q19.b)(2022)

There is an anomalous result for student R.

Draw a ring around the anomalous result in Table 1.

[1 mark]

Q19.c)(2022)

Homeostasis and Response

<http://www.pcfgstudy.com>

Give **two** factors that might affect a person's reaction time.

[2 marks]

1 _____

2 _____

Q20.(2023)

A person's eyes can focus on objects at different distances.

A person looks at a distant object.

The person then looks at a near object.

The person's eyes make adjustments so that the near object forms a clear image.

Which term describes the adjustment of focus from the distant object to the near object?

[1 mark]

Tick (✓) **one** box.

Accommodation

☐

Adaptation

☐

Hyperopia

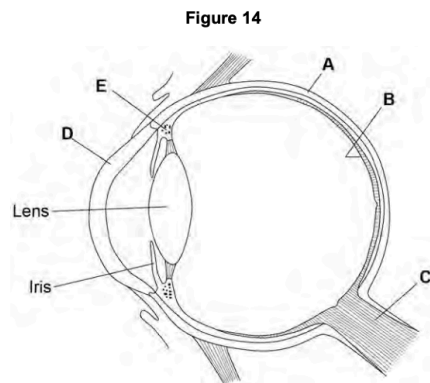
☐

Myopia

☐

Q21.a)(2023)

Figure 14 shows the eye.



Which structure in **Figure 14** is where the image is focused?

[1 mark]

Tick (✓) **one** box.

A ☐ B ☐ C ☐ D ☐ E ☐

Q21.b)(2023)

Which structure in **Figure 14** is a muscle that contracts when focusing on a near object?

[1 mark]

Tick (✓) **one** box.

A	☐	B	☐	C	☐	D	☐	E	☐
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Q21.c)(2023)

What happens to the shape of the lens when focusing on a near object?

[1 mark]

Q21.d)(2023)

The eyes can function in dimly-lit areas and in brightly-lit areas.

The iris contains muscles.

Describe how muscles in the iris help the person to see clearly when moving from a dimly-lit area to a brightly-lit area.

[2 marks]

Q22.(2023)

Homeostasis and Response

<http://www.pcfgstudy.com>

It is important to be able to react quickly.

Many people think that drinking coffee decreases reaction time.

Plan an investigation to test the effect of drinking coffee on reaction time.

You should include:

- the test for reaction time that you would use
- how to make the investigation valid.

[4 marks]

Q23.(2024)

The nervous system allows humans to:

- respond to stimuli
- coordinate their behaviour.

Complete the order of structures to link a stimulus to a response.

[2 marks]

Choose answers from the box.

coordinator	effector	receptor
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stimulus → _____ → _____ → _____ → response

Q24.(2024)

Some human actions are reflex actions.

What is a reflex action?

[2 marks]

Q25.(2024)

Which is an example of a reflex action?

[1 mark]

Tick (✓) **one** box.

Blinking in sudden bright light

☐

Kicking a ball in a game

☐

Writing a message to a friend

☐

Q26.(2024)

Many reflex actions are movements.

What type of tissue causes movement?

[1 mark]

Tick (✓) **one** box.

Blood

☐

Gland

☐

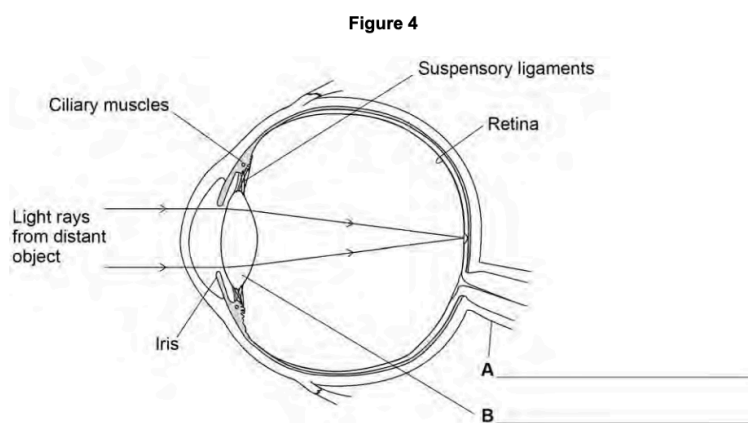
Muscle

☐

Q27.a)(2024)

The human eye can make clear images of objects.

Figure 4 shows how the human eye focuses light rays from a distant object onto the retina.



Label structures **A** and **B** on **Figure 4**.

Choose answers from the box.

[2 marks]

cornea	lens	optic nerve	sclera
--------	------	-------------	--------

Q27.b)(2024)

The eye in **Figure 4** is focused on a distant object.

Complete the sentence.

Choose the answer from the box.

[1 mark]

contract	expand	stretch
----------	--------	---------

To focus on a **near** object the ciliary muscles _____.

Q27.c)(2024)

Complete the sentence.

Choose the answer from the box.

[1 mark]

longer	thicker	thinner
--------	---------	---------

To focus on a **near** object structure **B** in **Figure 4**

becomes _____.

Q27.d)(2024)

The eye in **Figure 4** is looking at an object in dim light.

Complete the sentence.

Choose the answer from the box.

[1 mark]

iris	retina	suspensory ligaments
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When the eye looks at an object in **bright** light the pupil gets smaller.

The size of the pupil is controlled by the _____.

Q27.e)(2024)

The retina is sensitive to light.

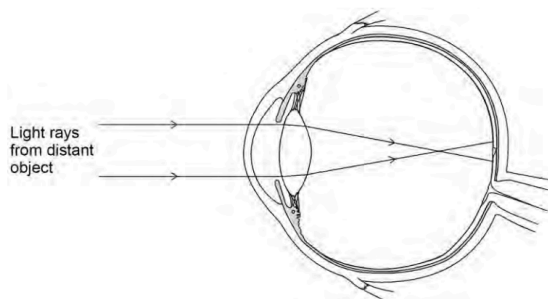
How does information from the retina reach the brain via structure **A** in **Figure 4**?
[1 mark]

Q28.a)(2024)

Figure 5 shows the eye of a person who is short sighted looking at a distant object.

The person **cannot** see the object clearly.

Figure 5



Give the reason why the person **cannot** see the object clearly.
[1 mark]

Q28.b)(2024)

Short sightedness can be corrected using spectacle lenses.

Give **one** other way short sightedness can be corrected.

Do **not** refer to spectacles in your answer.

[1 mark]
