

The Human Nervous System

Question Paper 1

Level	GCSE (9-1)
Subject	Combined Science – Trilogy - Biology
Exam Board	AQA
Topic	4.5 Homeostasis and Response
Sub-Topic	The Human Nervous System
Difficulty Level	Bronze Level
Booklet	Question Paper 1

Time Allowed: 59 minutes

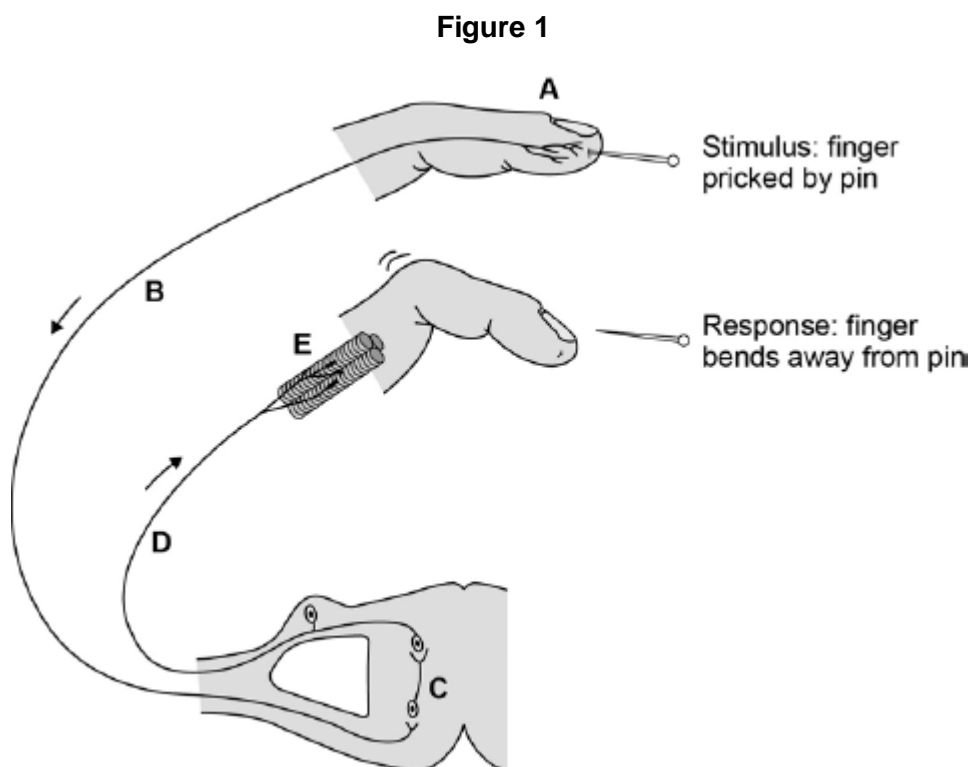
Score: / 58

Percentage: /100

Grade Boundaries:

Q1. Our nervous system controls our reactions.

Figure 1 shows the part of the nervous system involved in the rapid response to a stimulus.



(a) What is this type of rapid response called?

Tick **one** box.

Circular action

☐

Fast action

☐

Forced action

☐

Reflex action

☐

(1)

(b) Features of the nervous system are labelled **A**, **B**, **C**, **D** and **E** on **Figure 1**.

Draw **one** line from each feature to the correct label from **Figure 1**.

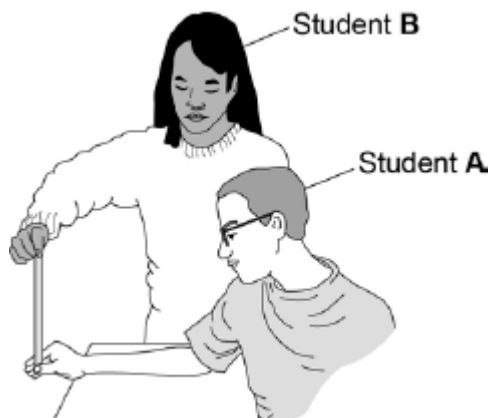
Feature	Label
	A
Effector	B
Relay neurone	C
Sensory neurone	D
	E

(3)

- (c) Two students compare their reactions using a ruler.

This is the method used.

- Student **A** sits with his elbow on a table top.
- Student **B** holds the ruler so the bottom of the ruler is level with the top of student **A**'s thumb.
- Student **B** drops the ruler.
- Student **A** catches the ruler.
- Record the drop distance.
- Repeat steps 1 to 5 four more times.
- Repeat the whole experiment with student **A** dropping the ruler and student **B** catching it.



Both students are right-handed.

The students are testing the hypothesis:

the drop distance of the ruler is smaller when a right-handed person uses their right hand to catch the ruler.

Student **A** uses his right hand to catch the ruler.

Student **B** uses her left hand to catch the ruler.

Complete the sentence.

Use an answer from the box.

control	dependent endent	indep
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The drop distance was the variable.

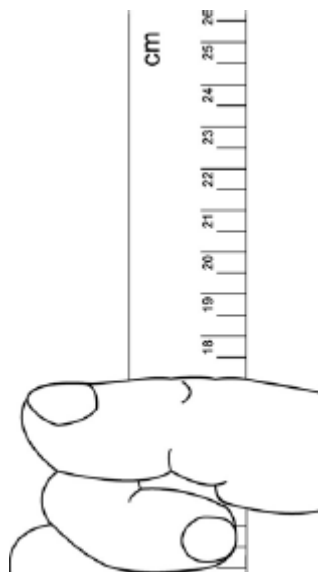
(1)

(d) The table below shows the students' results.

Student	Drop distance in cm				
	Test 1	Test 2	Test 3	Test 4	Test 5
Student A	17.5	15.5	15.0	23.5	17.0
Student B	20.5		19.5	21.0	19.0

Figure 2 shows student **B**'s Test 2 result.

Figure 2



Use **Figure 2** to complete the missing result for Test 2.

Write the answer in the table above.

(1)

- (e) What was the resolution of the ruler the students used?

Tick **one** box.

0.1 cm

☐

0.5 cm

☐

1 cm

☐

10 cm

☐

(1)

- (f) One of the results in the table above is anomalous.

Identify the anomalous result.

Give the reason why you chose your answer.

.....

.....
.....

(2)

- (g) The students are testing the hypothesis:

the drop distance of the ruler is smaller when a right-handed person uses their right hand to catch the ruler.

The results in the table above are not a good test of the hypothesis.

What is one reason why?

Tick **one** box.

The drop distances are very variable

☐

The drop distance for Student **A** is sometimes bigger than the drop distance for Student **B**

☐

The results are for the left and right hands of different people

☐

The drop distances are not measured accurately enough

☐

(1)

(Total 10 marks)

Q2. Humans use the nervous system to react to changes in the environment.

- (a) (i) Which word means a change in the environment?

Draw a ring around the correct answer.

neurone

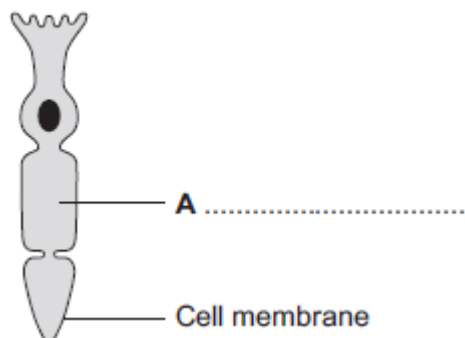
reflex

stimulus

(1)

- (ii) **Figure 1** shows a light receptor cell.

Figure 1



Use the correct answer from the box to label part **A** on **Figure 1**.

chloroplast	cytoplasm	vacuole
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(1)

- (b) **Figure 2** shows a boy riding a bicycle on a sunny day.

Figure 2



© Stockbyte/Thinkstock

- (i) Receptors in the boy's body detect changes in the environment.

Complete the table to show which organ of the body contains the receptors for each change in the environment.

Change in the environment	Organ that contains the receptors
Sound of traffic from behind him	

Flashing blue lights of a police car	
Cooler air temperature in the shadows	

(3)

- (ii) The boy's response to danger is to pull on the bicycle brakes.

Which type of effector causes this response?

Tick (✓) **one** box.

A gland

☐

A muscle

☐

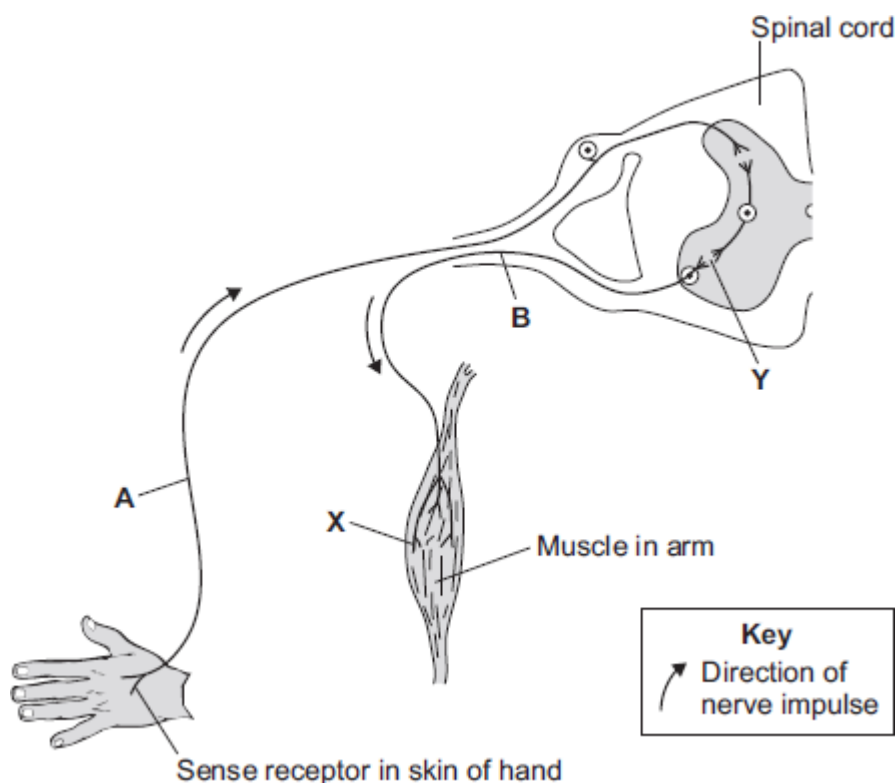
A synapse

☐

(1)
(Total 6 marks)

- Q3.(a)** **Diagram 1** shows the neurones and parts of the body involved in a response to touching a hot object.

Diagram 1



A neurone is a nerve cell. Neurones carry impulses around the body.

- (i) Draw a ring around the correct answer to complete each sentence.

Neurone **A** is a

- motor neurone.
relay neurone.
sensory neurone.

At point **Y** there is a tiny gap between two neurones called

- an effector.
a receptor.
a synapse.

(2)

- (ii) The hand touches a hot object. An impulse travels through the nervous system to the muscle (point **X**). The muscle moves the hand away from the hot object.

What does the muscle do to move the hand away from the hot object?

Tick (✓) **one** box.

contract

☐

relax

☐

stretch

☐

(1)

(iii) The action described in part **(a) (ii)** is a reflex action.

How can you tell that this action is **not** a conscious action?

Use information from the diagram.

.....

.....

(1)

(iv) Reflex actions like this are useful.

Explain why.

.....

.....

.....

.....

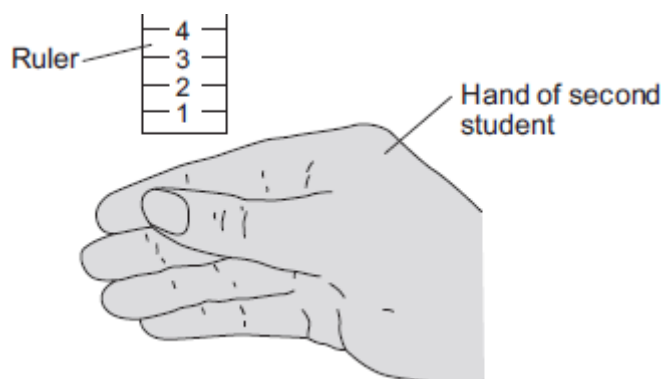
(2)

(b) Some students investigated the effect of caffeine on a person's reaction time.

The students used the following steps.

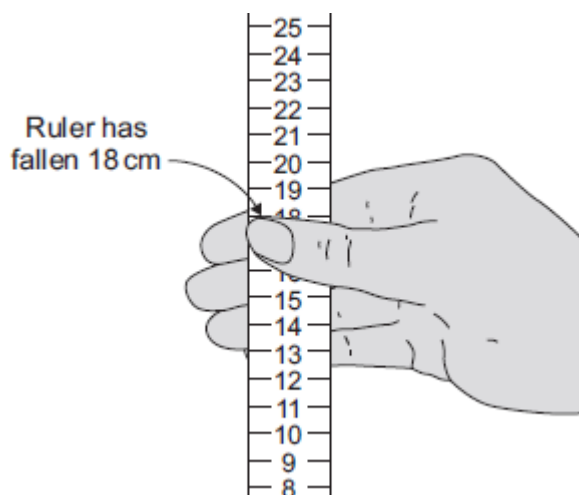
1. One student held a ruler just above a second student's hand, as shown in **Diagram 2**.

Diagram 2



2. The student let go of the ruler. The second student caught it as soon as possible, as shown in **Diagram 3**.

Diagram 3



3. The students repeated this experiment seven more times.
4. The student catching the ruler then drank a cup of strong coffee.
Coffee contains caffeine.
5. Fifteen minutes after drinking the coffee the students repeated steps 1 to 3.

Table 1 and **Table 2** show the students' results.

Table 1	Table 2
Distance ruler fell before it was caught in cm	Distance ruler fell before it was caught in cm
Before drinking coffee	After drinking coffee
18	8
21	13
25	11
15	17
19	10
16	14
12	13
21	13
Mean = 18.4	Mean = 12.4

- (i) The students used the reading on the ruler as a measure of the reaction time.

What do the results show about the effect of caffeine on reaction time?

.....

(1)

- (ii) Look carefully at **all** the data in **Table 1** and **Table 2**.

Using the data in **Table 1** and **Table 2**, give **one** reason why a scientist may **not** accept your conclusion in part (b) (i).

.....

(1)

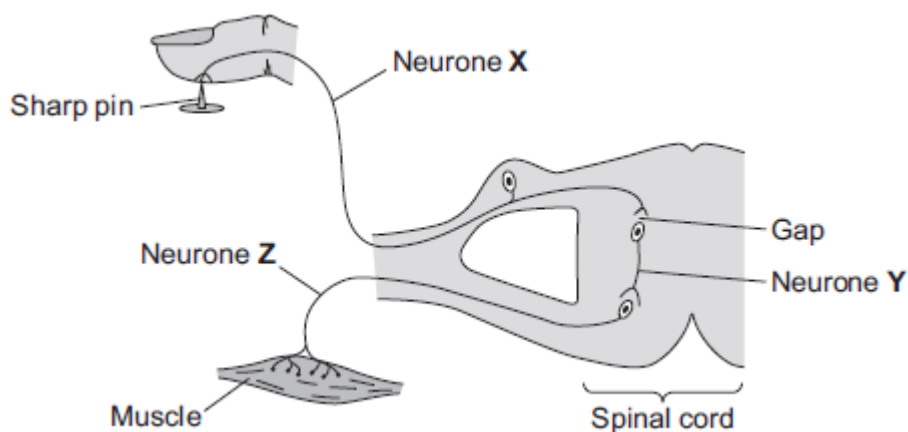
(iii) How could the students improve their investigation?

Suggest **two** ways.

- 1
-
- 2
-

(2)
(Total 10 marks)

Q4. The diagram below shows the pathway for a simple reflex action.



(a) What type of neurone is neurone **X**?

Draw a ring around the correct answer.

motor neurone

relay neurone

sensory neurone

(1)

(b) There is a gap between neurone **X** and neurone **Y**.

(i) What word is used to describe a gap between two neurones?

Draw a ring around the correct answer.

effector

receptor

synapse

(1)

(ii) Draw a ring around the correct answer to complete the sentence.

Information passes across the gap as

a chemical.

an electrical impulse.

pressure.

(1)

(c) Describe what happens to the muscle when it receives an impulse from neurone **Z**.
How does this reflex action help the body?

What happens to the muscle

.....

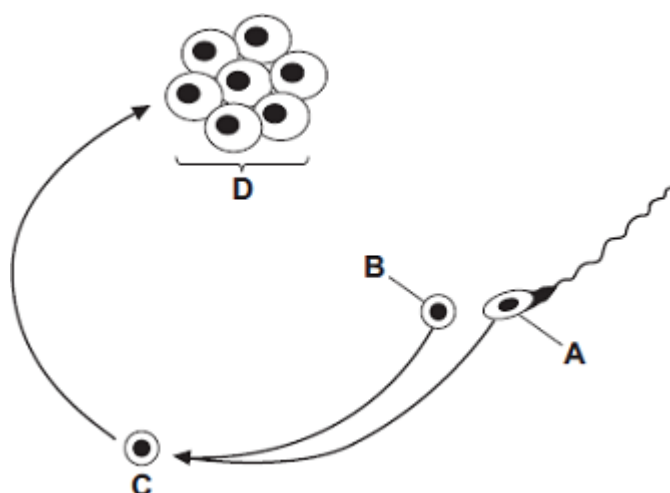
How this helps the body

.....

(2)

(Total 5 marks)

Q5. The diagram shows some of the stages in IVF (in vitro fertilisation).



- (a) Use words from the box to name structures **A**, **B**, **C** and **D**.

egg	embryo	fertilised egg	ovary	sperm
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Structure **A**

Structure **B**

Structure **C**

Structure **D**

(4)

- (b) What do doctors do next with structure **D**?

.....

.....

.....

.....

(2)

- (c) The table gives statistics for an IVF clinic.

	Age of women treated			
	Below 35 years	35 – 37 years	38 – 39 years	40 – 42 years
Number of women treated	414	207	106	53
Number of women who produced one baby	90	43	17	1
Number of women who produced twins	24	8	4	1
Number of women who produced triplets	1	0	0	0

- (i) About what proportion of the treated women aged 35 – 37 years produced one or more babies?

Draw a ring around your answer.

one quarter one third half

(1)

- (ii) This clinic does **not** give IVF treatment to women over 42 years of age.

Use data from the table to explain why.

.....

.....

.....

.....

(2)

- (iii) The committee which regulates IVF treatment now advises that only one embryo is used in each treatment.

Suggest **one** reason for this.

.....

.....

(1)

(Total 10 marks)

Q6. The nervous system allows humans to react to their surroundings.

- (a) Sense organs have receptors. Receptors detect *changes in the environment*.

Which word describes *a change in the environment*?

Draw a ring around **one** answer.

an effector a neurone a stimulus

(1)

- (b) The photograph shows a baby.
Labels **A**, **B**, **C**, **D** and **E** show some of the baby's sense organs.

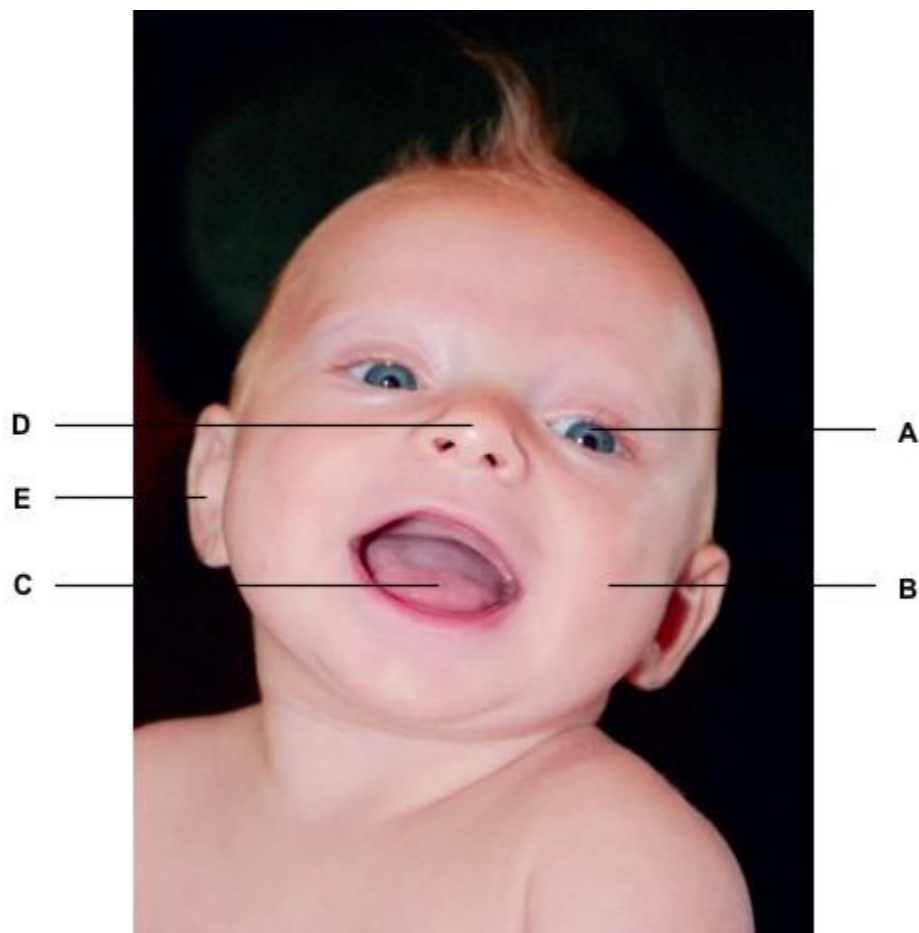


Photo by D. Sharon Pruitt [CC-BY-2.0], via Wikimedia Commons

Answer each question by writing **one** letter, **A, B, C, D** or **E**, in each box.

- (i) Which sense organ has receptors sensitive to light?

(1)

- (ii) Which **two** sense organs have receptors sensitive to chemicals?

and

(2)

- (iii) Which sense organ has receptors sensitive to changes in the baby's position?

(1)

- (c) Information from sense organ **A** is passed along nerve cells.
The information is coordinated to produce a response.

Which organ in the body coordinates the information?

.....

(1)
(Total 6 marks)

Q7. The photograph shows a new-born baby.



By SCA Svenska Cellulosa Aktiebolaget [CC-BY-2.0], via Wikimedia Commons

- (a) New-born babies have reflex actions. The reflex actions help new-born babies to survive.

Draw a line from each reflex action to the way in which it helps the baby to survive.

Reflex action

How the reflex action helps the baby

If milk goes down the baby's windpipe the baby coughs

Helps the baby to hold on to the mother

If the mother touches the palm of the baby's hand, the baby clenches its fist.

Prevents the baby from choking

If the mother strokes the baby's mouth, the baby begins to suck.

If a bright light shines on the baby, the baby's eyes shut.

Helps to protect some of the baby's receptors

Helps the baby to crawl

Helps the baby to feed

(4)

(b) Which **two** of the following may be effectors in reflex actions?

Tick (✓) **two** boxes.

Brain

☐

Glands



Motor neurones



Muscles



Sensory neurones



(2)
(Total 6 marks)

Q8. The photograph shows a girl waiting to cross a road.



© Lionel Lassman

- (a) Name **two** different sense organs she would use to detect when it is safe to cross the road.

1

2

(2)

- (b) Which sense organ contains receptors that help the girl to keep her balance?

.....

(1)

- (c) (i) Complete the sentence.

A car driver automatically brakes if a child dashes out into the road.

This is called a action.

(1)

(ii) Draw a ring around the correct answer to complete the sentence.

In the nervous system, information passes along cells called	<div>effectors</div> <div>neurones</div> <div>synapses</div>	.
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(1)
(Total 5 marks)