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	Silver Level
Booklet	Question Paper 1

Time Allowed: **40 minutes**

Score: **/ 38**

Percentage: **/100**

Grade Boundaries:

Q1. Neurones pass information around the body.

(a) Why are reflex reactions important?

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(1)

(b) Caffeine is a drug found in coffee.

After a person drinks coffee information passes through neurones in the nervous system more quickly.

Suggest a hypothesis for the effect of caffeine concentration on reaction time.

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(1)

(c) Two students investigated the effect of caffeine concentration on reaction time.

This is the method used.

1. Student **A** drinks a cup of coffee.
2. Student **B** holds a ruler above Student **A**'s hand.
3. Student **B** drops the ruler.
4. Student **A** catches the ruler as quickly as she can.
5. The distance the ruler falls is recorded.

Suggest how this method could be improved to produce valid results.

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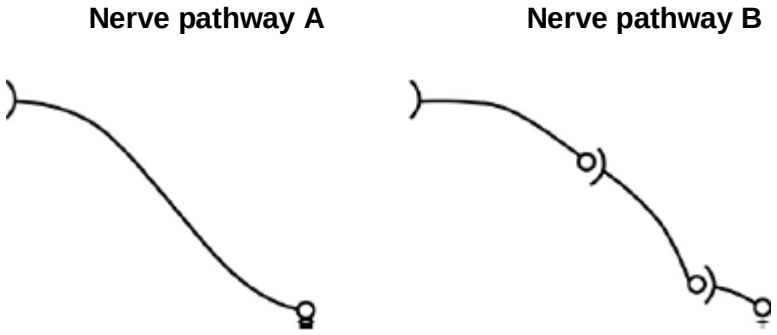
(6)
(Total 8 marks)

Q2. The nervous system allows humans to respond to their surroundings.

The figure below shows two nerve pathways.



(a) Nerve pathway **A** is 92 cm long.

A nerve impulse travels along pathway **A** at 76.2 m / s.

Calculate how long it takes for the nerve impulse to travel the length of the pathway.

Use the equation:

distance = speed × time

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Time = ... s

(3)

(b) Nerve pathways **A** and **B** are the same length.

The nerve impulse takes longer to travel along pathway **A** than along pathway **B**.

Use the figure above to explain why.

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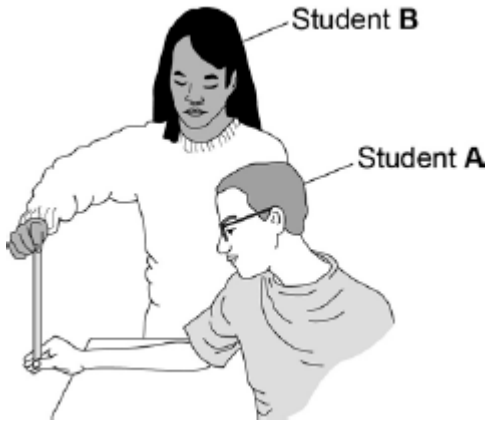
(3)

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

This is the method used.

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



Both students are right-handed.

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

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

The table below shows the students' results.

Student	**Drop distance in mm**				
	Test 1	**Test 2**	**Test 3**	**Test 4**	**Test 5**
Student **A** – right hand	203	167	140	156	163
Student **B** – left hand	230	211	279	215	264

What is the range of student **A**'s results?

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(1)

(d) 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 students' results in the table above are not a good test of the hypothesis.

Suggest what the students should have done to test the hypothesis.

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(3)

(e) Student **A**'s mean reaction time was 0.19 s.

Mean reaction time can be calculated using the equation:

$$\text{Mean reaction time} = \sqrt{\frac{2 \times \text{mean drop distance in m}}{9.8\ \text{m/s}^2}}$$

Calculate the mean reaction time for Student **B**.

Give your answer to two significant figures.

Student **B**'s results are repeated here to help you answer the question.

	Drop distance in mm				
	Test 1	**Test 2**	**Test 3**	**Test 4**	**Test 5**
Student **B** – left hand	230	211	279	215	264

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Mean reaction time = ... s

(4)

(Total 14 marks)

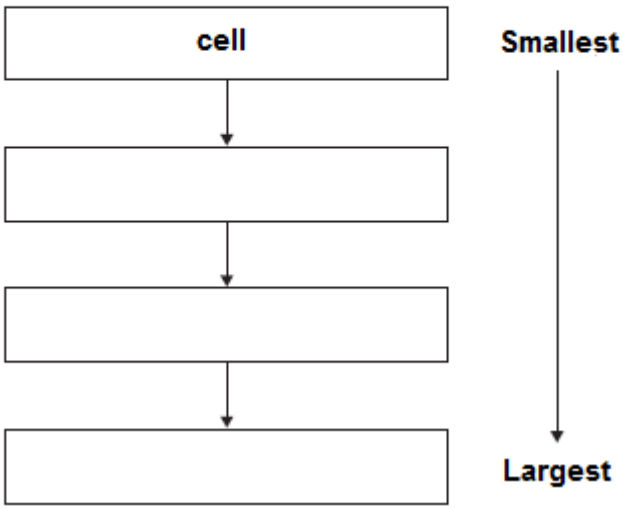
Q3. The human body is organised to carry out many different functions.

(a) Use words from the box to complete **Figure 1** by putting the parts of the body in order of size from smallest to largest.

The smallest one has been done for you.

cell	organ system	organ	tissue

Figure 1



(2)

(b) The stomach is made of different types of tissue.

Draw **one** line from each type of stomach tissue to the correct description.

Epithelial tissue	Allows food to be churned around the stomach
Glandular tissue	Covers the outside and the inside of the stomach
Muscular tissue	Produces digestive juices
	Coordinates nerve impulses

(3)

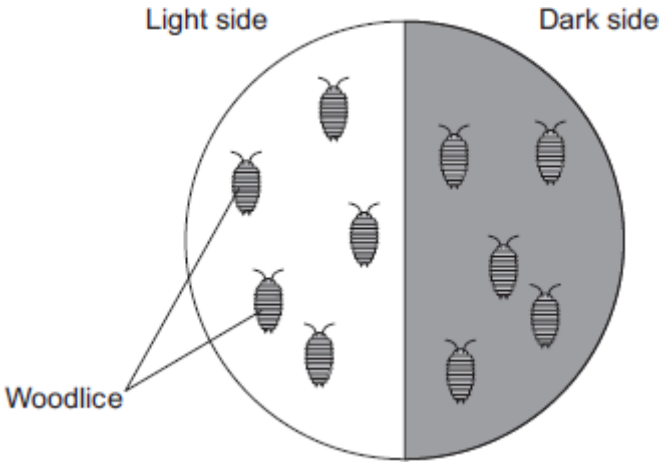
(c) Animals can react to their surroundings because they have nervous systems.

A student investigated the behaviour of small animals called woodlice.

The student set up the investigation as shown in **Figure 2.**

- The student covered one half of a Petri dish with black paper to make that side of the Petri dish dark.
- The other side had no cover.
- The student put five woodlice into each side of the dish and then put the clear Petri dish lid back on the dish.

Figure 2



After 30 minutes, all the woodlice had moved to the dark side of the Petri dish.

(i) In this investigation, what is the **stimulus** that the woodlice responded to?

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(1)

(ii) In this investigation, what is the **response** that the woodlice made?

.....

(1)

(iii) The student concluded that woodlice prefer dark conditions.

Give **two** ways in which the student could improve the investigation to be sure that his conclusion was correct.

1.....

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2.....

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(2)
(Total 9 marks)

Q4. This question is about the nervous system.

(a) Describe the function of receptors in the skin.

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(2)

(b) A response is caused when information in the nervous system reaches an effector.

(i) There are two different types of effector.

Complete the table to show:

- the two different types of effector
- the response each type of effector makes.

Type of effector	Response the effector makes
1	....
2	....

(4)

(ii) Some effectors help to control body temperature.

Give **one** reason why it is important to control body temperature.

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(1)

(Total 7 marks)