

# The Human Nervous System

## Mark Scheme 1

<b>Level</b>	GCSE (9-1)
<b>Subject</b>	Combined Science – Trilogy - Biology
<b>Exam Board</b>	AQA
<b>Topic</b>	4.5 Homeostasis and Response
<b>Sub-Topic</b>	The Human Nervous System
<b>Difficulty Level</b>	Silver Level
<b>Booklet</b>	Mark Scheme 1

**Time Allowed:** 40 minutes

**Score:** / 38

**Percentage:** /100

**Grade Boundaries:**

**M1.(a)** fast reaction to reduce / protect from harm

*allow named examples*

1

(b) higher caffeine concentration causes shorter reaction time.

*allow converse*

*ignore 'faster / slower reaction time'*

1

(c) **Level 3 (5–6 marks):**

A coherent method is described with relevant detail, which demonstrates a broad understanding of the relevant scientific techniques and procedures. The steps in the method are logically ordered. The method would lead to the collection of valid results.

**Level 2 (3–4 marks):**

The bulk of a method is described with mostly relevant detail, which demonstrates a reasonable understanding of the relevant techniques and procedures. The method may

not be in a completely logical sequence and may be missing some detail.

**Level 1 (1–2 marks):**

Discrete relevant points are made which demonstrate some understanding of the relevant scientific techniques and procedures. They may lack a logical structure and would not

lead to the production of valid results.

**0 marks:**

No relevant content.

**Indicative content**

- use decaffeinated coffee as control
- control volume of coffee
- blind trial or do not tell students which coffee they are drinking
- left for standard time between drink and test
- at least 10 minutes
- control start position of ruler
- control other factors such as light in the room
- same person for different concentrations
- repeat for each caffeine concentration
- use a range of caffeine concentrations
- start with lowest concentration of caffeine
- use caffeine solution instead of coffee to control for other ingredients
- repeat investigation with more people and calculate means

6

[8]

M2.(a)	$0.92 = 76.2 \times \text{time}$	1
	$\text{time} = 0.92 \div 76.2$	1
	$= 0.012$ <i>allow 0.012 with no working shown for 3 marks</i>	1
(b)	pathway <b>B</b> has two synapses <i>allow converse for pathway A</i>	1
	chemicals diffuse across each synapse	1
	which slows down the impulse	1
(c)	140–203	1
(d)	use the same person for each test	1
	use left hand <b>and</b> right hand	1
	use a bigger sample size <b>or</b> more people <i>allow take more readings with each person</i>	1
(e)	mean drop distance = $(230 + 211 + 279 + 215 + 264) \div 5 = 239.8$	1
	$239.8 \text{ mm} = 0.2398 \text{ m}$	1
	mean reaction time = $\sqrt{\frac{2 \times 0.2398}{9.8}}$	1
	$= 0.221$ <i>incorrect sig. figs max. 3 marks</i>	1

allow 0.221 with no working shown for **4** marks

[14]

**M3.(a)** tissue → organ → organ system

*one right for 1 mark*

*three right for 2 marks*

2

(b) **Epithelial tissue** → covers the outside and the inside of the stomach

*more than one line from a tissue = no mark*

1

**Glandular tissue** → produces digestive juices

1

**Muscular tissue** → allows food to be churned around the stomach

1

(c) (i) light

*ignore dark*

1

(ii) moving (to the dark)

1

(iii) any **two** from:

- use more woodlice
- repeat the experiment
- run for a longer time

2

[9]

**M4.(a)** detect changes in surroundings **or** detect stimuli

*allow any named stimulus for skin*

1

convert information to impulse

*allow send impulse to sensory neurones / brain*

1

(b) (i)

muscle	contract(ion)
gland	release / secrete / produce chemical / hormone / enzyme

*1 mark for each effector*

*1 mark for each response*

*response must match type of effector (if given)*

*ignore examples*

*ignore relax(ation) / movement for contraction*

*do **not** allow expansion for muscles*

4

(ii) any **one** from:

- (maintain temperature at which) enzymes work best
  - so chemical reactions are fast(est)
  - prevent damage to cells / enzymes
- allow prevent enzymes being denatured (by temperature being too high)*

1

[7]