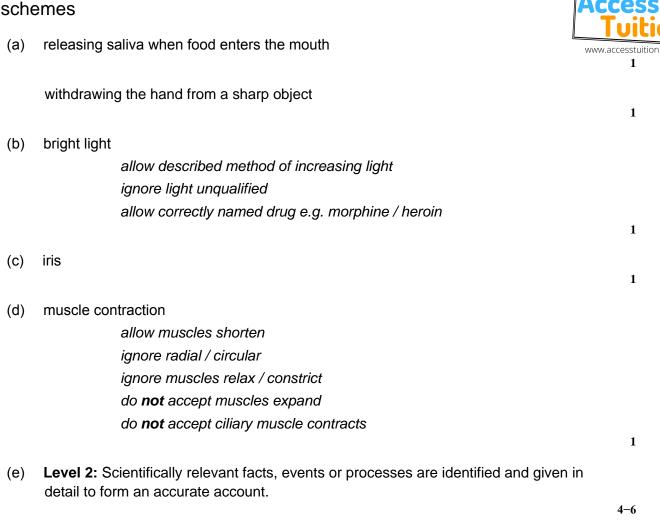
## Mark schemes

1.



Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.

1-3

## No relevant content

0

## Indicative content



- receptor detects stimulus
- e.g. receptor detects pressure
- receptor generates impulses / electrical signals
- neurones conduct impulses / electrical signals
- neurone A conducts impulses to spinal cord
- neurone A = sensory neurone
- synapse between neurones
- chemical (/ neurotransmitter) crosses synapse
- chemical stimulates impulse(s) in neurone B
- neurone B = relay neurone
- neurone C = motor neurone
- effector carries out response
- e.g. muscles of the arm / leg contract
- muscles contract or gland secretes chemicals

to access **level 2**, candidates need to consider, in terms of the indicative content, the receptor, the neurones and the effector in the correct sequence

[11]

- 2.
- (a) any **two** from:
  - drop the ruler from the same height
  - use the same / dominant hand each time
  - thumb same distance from ruler at the start
  - use same type / weight of ruler
  - drop the ruler without any force each time
  - keep arm resting on the edge of the table

2

- (b) 8
- allow 8.0

1

(c) 2 (in test number 2)

1

(d) 12

1

(e) (12 + 13 + 13 + 9 + 8 / 5 =) 11

1

(f) 0.15 - 0.12 (s)

1

- 0.03(s)
- allow 0.03 (s) with no working shown for 2 marks

1

(g) carry out more repeats

1

3.

(c)

(i)

skin

ignore hand / leg

1

[10]

(iii) any two from: ignore length of neurones synapses slow down transmission / impulse allow idea of movement of chemical being slower than electrical impulse fewer synapses (via brain) allow one synapse compared to two or only one synapse (therefore) fewer delays allow impulse travels more slowly in relay neurones 2 [12] (a) (i) stimulus 4. 1 (ii) cytoplasm 1 (b) (i) ear(s) in this order only 1 eye(s) accept retina 1 skin ignore extra detail 1 (ii) A muscle 1 [6] (a) (i) sensory neurone 5. 1 a synapse 1 (ii) contract 1 (iii) not connected to brain / coordinated only by spinal cord 1

(ii)

1.6 (cm per millisecond)

allow 2 if evidence of rounding up of 1.6

1

(iv) automatic / rapid (response)

allow no thinking / faster / less time



1

protects body from danger / from damage / from burning

1

(b) (i) caffeine decreases reaction time accept caffeine speeds up / quicker reactions

1

(ii) the two sets of results overlap (considerably)

allow use of appropriate numbers – eg 5 of the 'after' results overlap with the 'before' results allow 'wide spread of results' allow 'it was just one person' or 'it was a small sample' accept use of one pair of results only – if meaning is clear accept use of one pair of overlapping results

1

- (iii) any two sensible suggestions: eg
  - more repetitions
  - perform investigation on several other people
  - use other (measured) amounts of coffee
  - use different / more time intervals
  - other suggested measure of reaction time eg computer-generated light flash + time measurement
  - use pure caffeine or caffeine tablets

2

[10]