

- M1.**
- (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

- (h) caffeine speeds up reflex actions
or
reduces reaction time

1
[10]

M2.	(a)	A sperm	1
		B egg	1
		C fertilised egg	1
		D embryo	1
	(b)	insert into mother <i>ignore fertilise / check fertilisation / check viability</i>	1
		womb / uterus	1
	(c)	(i) one quarter	1
		(ii) no / little chance of success over 42	1
		reference to table of only two women in the age bracket 40-42 years became pregnant <i>the statement 'only 2 out of 53 40-42 year old women became pregnant / had babies' gains 2 marks</i>	1
		(iii) so fewer twins / multiple births or multiple births more dangerous	

1
[10]

M3. (a) (i) skin

1

(ii) kidneys
accept kidney

1

(iii) lungs
accept lung

1

(b) (i) multiply temperature by number of students at that temperature and add them up

allow (36.8 5) + (36.9 3) + (37.0 6) + (37.1 7) + (37.2 3)
allow 888

1

divide by number of students
allow divide by 24

1

(ii) 10 / ten

1

(iii) so enzymes work (well)
ignore death / overheating / hypothermia
allow body reactions work (well)

1

[7]

M4.(a) brain

in correct order only

1

blood

1

sweat

1

(b) (i) A

1

(ii) to replace ions lost (in sweat)

accept salts

allow named examples, eg. prevent cramps

1

(iii) any **one** from:

- there is too much glucose / sugar in the sports drink
- they shouldn't have too much glucose / blood sugar
- it would cause their blood glucose / sugar to rise (too high)

1

[6]

M5.(a) sensory neurone

1

(b) (i) synapse

1

(ii) a chemical

1

(c) (What happens to the muscle)

mark both parts of the question together

any **one** from:

- contraction / contracts
ignore relaxation / relaxes / tenses

1

- gets shorter

(How this helps the body)

idea of protection for body (from damage / pain)

eg moves finger / arm away (from pin / stimulus / source of pain)

1

[5]

- M6.** (a) (i) stimulus 1
- (ii) cytoplasm 1
- (b) (i) ear(s) 1
in this order only
- eye(s) 1
accept retina
- skin 1
ignore extra detail
- (ii) A muscle 1

[6]

- M7.(a) (i) sensory neurone 1
- a synapse 1
- (ii) contract 1
- (iii) not connected to brain / coordinated only by spinal cord 1
- (iv) automatic / rapid (response) 1
- allow no thinking / faster / less time*
- protects body from danger / from damage / from burning 1
- (b) (i) caffeine decreases reaction time 1
- accept caffeine speeds up / quicker reactions*
- (ii) the two sets of results overlap (considerably) 1
- 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*
- (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]