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

ignore fertilise / check fertilisation / check viability

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

*the statement 'only 2 out of 53 40-42 year old women became pregnant / had babies' gains **2** marks*

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 <u>enzymes</u> work (well)

ignore death / overheating / hypothermia

allow body <u>reactions</u> 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)

in this order only

1

eye(s)

accept retina

1

skin

ignore extra detail

1

(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)

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]