

M1.(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]

M2. (a) Y - spinal cord / central nervous system / CNS

*do **not** accept spine*

ignore nerve / nervous system / coordinator

ignore grey / white matter

1

W - receptor / nerve ending

ignore sensory / neurone / stimulus

1

X - effector / muscle

allow gland

1

(b) any **two** from: eg

accept reverse argument for each marking point

- reflex action quicker
- effect of reflex action over shorter period
- hormone involves blood system and reflex involves neurones / nerve cells
ignore nervous system / nerves
- reflex involves impulses and hormone involves chemicals
- reflex action affects only one part of the body
ignore involves brain
ignore outside / inside stimuli

2

[5]

M3. (a) B

1

less / no insulin (produced) **or** insulin produced in pancreas
allow pancreas can't monitor (blood) sugar (level)
ignore pancreas can't control (blood) sugar (level)
allow increased glucagon production
allow A as liver stores less glucose / sugar for 2 marks only

1

(b) (i) (it / protein / insulin) digested / broken down
if ref to specific enzyme must be correct (protease / pepsin)
ignore denatured
*do **not** accept digested in mouth / other incorrect organs*

1

(ii) any **two** from:
ignore injections

- (attention to) diet
*accept examples, eg eat less sugar(y food) **or** eat small regular meals*
allow eat less carbohydrate / control diet
ignore cholesterol or balanced / healthy diet
- exercise
ignore keep fit / healthy
- (pancreas) transplant / stem cells / genetic engineering

2

[5]

- M4.** (a) (i) any **one** from:
- chemical messenger / message
allow substance / material which is a messenger
 - chemical / substance produced by a gland
allow material produced by a gland
 - chemical / substance transported to / acting on a target organ
 - chemical / substance that controls body functions
- 1
- (ii) gland / named endocrine gland
brain alone is insufficient
allow phonetic spelling
- 1
- (iii) in blood / plasma **or** circulatory system **or** bloodstream
accept blood vessels / named
*do **not** accept blood cells / named*
- 1
- (b) *each hormone must be linked to correct action apply list principle ignore the gland producing hormone*
- FSH stimulates oestrogen (production) / egg maturation / egg ripening
ignore production / development of egg
- 1
- oestrogen inhibits FSH
allow oestrogen stimulates LH / build up of uterine lining
- 1
- LH stimulates egg / ovum release / ovulation
accept LH inhibits oestrogen
accept LH controls / stimulates
growth of corpus luteum
ignore production of egg
- 1

M5. (a) (i) the lower the temperature the shorter the time
a trend is required
accept reverse

or

the lower the temperature the more chance of frostbite
accept the lower the temperature the faster you get frostbite
*accept positive correlation but **not** directly proportional*
ignore wind speed

1

(ii) any value from 5 to below 10
*do **not** accept 10*
*allow less than 10 **or** < 10*

1

(b) Muscles 'shiver'
if more than two boxes ticked deduct 1 mark for each additional tick

1

Blood vessels supplying the skin capillaries constrict

1

- M6.** (a) (i) **A** – pituitary
allow hypothalamus 1
- B** – ovary / ovaries 1
- (ii) in blood (stream)
accept in plasma
ignore dissolved 1
- (b) (i) FSH and Luteinising Hormone (LH) 1
- (ii) fertilised
OR
reference to sperm 1
- form embryos / ball of cells or cell division 1
- (embryo) inserted into mother's womb / uterus
allow (fertilised egg) is inserted into mother's womb / uterus 1
- (iii) any **one** from:
- multiple births lead to low birth weight
 - multiple births cause possible harm to mother / fetus / embryo / baby / miscarriages
allow premature

ignore reference to cost / ethics / population

1

(c) (i) any **one** from:

- almost identical
allow S (slightly) more successful
- both approximately 20%

1

(ii) larger numbers (in clinic R) (in 2007)
allow only 98 (in S) (compared to 1004 (in R))

1

results likely to be more repeatable (in 2008)
allow more reliable
*do **not** accept more reproducible / accurate / precise*

1

[11]

- M7. (a) (i) without oxygen
ignore reference to 'air' 1
- (ii) otherwise difficult to stir / to pump / to transfer
allow prevent 'clogging' owtte 1
- (iii) need to stir / pump / heat 1
- (b) (i) rises then falls 1
- then levels / slight rise 1
- quantitative descriptor
- e.g. to 80% / max. on day
4 / min. on day 16
accept other valid quantitative descriptor
allow accuracy $\pm \frac{1}{2}$ small square 1
- (ii) 16 (15.5 to 16.4) 1
- (c) any **two** from:
- oxygen present
 - (CO₂ produced) by aerobic respiration
or not much anaerobic respiration
 - **not** much methane / CH₄ produced

M8.(a) microorganisms

allow microbes / bacteria / fungi / decomposers

1

(microorganisms) respire

do not allow dead plants respire

1

(respiration / decay / microorganisms) releases (thermal) energy / 'heat'

ignore produce 'heat'

do not allow produce energy

do not allow dead plants release 'heat'

1

(b) (i) any **three** from:

- (opening) allows oxygen in
- microorganisms / eggs need oxygen
allow air for oxygen
- oxygen needed for respiration
- (opening) allows release of carbon dioxide (from microorganisms / respiration / eggs)
allow gaseous exchange (1 mark) of / for microorganisms / eggs (1 mark) if none of first four points given
- (opening) allows energy / 'heat' to escape
- (closing) retains energy / 'heat' if too cool / at night
if no mark awarded for either of these points allow 1 mark for vents open in the day to prevent overheating and close at night to prevent it getting too cold
- (closing) retains moisture
allow (opening) releases moisture

3

(ii) any **one** from:

- maintains sex balance
e.g. equal / best / correct numbers of male and female
- (survival of species depends on there being) males and females in population

allow so the offspring are not all the same sex

1

[7]

M9. Marks awarded for this answer will be determined by the Quality of Communication (QC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1 – 2 marks)

There is a description of thermoregulation **or** at least one correct mechanism (skin, sweat glands or muscles) but roles may be confused.

Level 2 (3 – 4 marks)

There is a description of thermoregulation **or** some correct mechanisms (sweating, shivering, blood flow in the skin).

Level 3 (5 – 6 marks)

There is a clear description of thermoregulation by TC or skin **and** some correct control mechanisms.

examples of biology points made in the response:

full marks may be awarded for detailed description of what happens if the core temperature is either too high or too low

- temperature receptors in TC
- the TC detects (core) body / blood temperature
- temperature receptors in the skin send impulses to the TC, giving information about skin temperature
- if the core body temperature is too high: blood vessels / arterioles supplying the skin capillaries dilate / vasodilation

***do not** accept refs to veins instead of arterioles or answers that imply blood vessels have moved up / down through the skin.*

- so that more blood flows (through the skin) and more heat is lost
- sweat glands release more sweat to cool the body
- by evaporation
- if the core body temperature is too low: blood vessels supplying the skin capillaries constrict
- to reduce the flow of blood (through the skin) and less heat is lost
- *allow idea of blood diverted to vital organs in extreme cold*
- muscles may shiver to release (heat) energy

- from respiration, some of which is lost as heat

[6]