

**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

[4]

- 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
  - (CO<sub>2</sub> produced) by aerobic respiration  
**or** not much anaerobic respiration
  - **not** much methane / CH<sub>4</sub> 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]