

MARK SCHEME

GCSE

BIOLOGY

AQA - TRIPLE SCIENCE

B 5 - TEST 4

HOMEOSTASIS

Intermediate

Mark schemes

1.	(a) releasing saliva when food enters the mouth	1
	withdrawing the hand from a sharp object	1
	(b) bright light	
	<i>allow described method of increasing light</i>	
	<i>ignore light unqualified</i>	
	<i>allow correctly named drug e.g. morphine / heroin</i>	1
	(c) iris	1
	(d) muscle contraction	
	<i>allow muscles shorten</i>	
	<i>ignore radial / circular</i>	
	<i>ignore muscles relax / constrict</i>	
	<i>do not accept muscles expand</i>	
	<i>do not accept ciliary muscle contracts</i>	1
	(e) Level 2: Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.	4–6
	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) (i) any **one** from:

- chemical messenger
- chemical / substance released in one part to have effect elsewhere in body
- chemical / substance which affects another / target organ / tissues / cells
allow chemical from endocrine gland

1

(ii) in blood / circulatory system / any named part including plasma

extra wrong answer would cancel example

not red blood cells

1

(b) **Quality of written communication:**

correct use of at least two relevant scientific terms spelt phonetically

e.g. pregnancy, ovulation, FSH, oestrogen, progesterone, ovary, follicle, circulation, thrombosis, feminisation, sperm count, STD

Q ✓ or Q ✗

1

any **three** from:

Oral contraceptives:

(benefit)

- prevent (unwanted) pregnancy **or** prevent egg release
- regulate menstrual cycle / periods

(problems)

- prolonged use may prevent later ovulation / cause infertility
- named side-effect on female body
e.g. circulatory problems / weight gain / nausea / headache / breast cancer / mood swings
- increased promiscuity / increase in STD's / STI's
- named side-effect on environment
e.g. feminisation of fish **or** lowered sperm count in human males

Fertility drugs:

(benefit)

- can enable woman to have children **or** to become pregnant
or stimulates egg release

(problem)

- multiple births
*for full marks must score at least **one** re contraceptives **and** at least **one** re fertility drugs*
*if unclear which type of hormone maximum **2** marks from 3*

3

[6]

3.

- (a) 2400 **and** 2280
or
500 **and** 380

1

120

1

*an answer of 120 scores **2** marks*

- (b) respiration of glucose

1

- (c) (more) sweating
ignore reference to vasodilation / vasoconstriction 1
- (because) exercise releases heat
or
 need to cool the body
or
 need to lose heat
or
 need to maintain body temperature
*do **not** accept energy being produced* 1
- (d) more energy needed
*do **not** accept energy production*
*do **not** accept energy needed for respiration* 1
- (so) more (aerobic) respiration 1
- (so) increased breathing (rate / depth) (to supply oxygen **or** remove carbon dioxide / water) 1
- 'more' does not need to be stated a second time to gain marking point 1 and marking point 2* 1
- [8]**
- 4.** (a) (i) 3.0
accept 3 1
- (ii) any **two** from:
- take in water
 - take in ions / minerals / nutrients
accept salts / named ions
ignore food
 - anchorage / support 2
- (iii) asexual reproduction 1
- (b) (i) a tropism 1
- (ii) if tip exposed / **A** – grows / bends towards light
*allow tip of **A** moves towards light*
*ignore **A** responds to light*
allow remained 'straight' 1

if tip covered / **B** – did not grow towards light / remained vertical

ignore B does not respond to light

ignore phototropism

only A grows towards the light = 2 marks

1

(c) (i) auxin

1

(ii) hormone comes from the tip

1

more on shady side / moves away from light

allow reference to right-hand side

1

stimulates growth

1

more growth on shady side (than on light side)

answer must be comparative

ignore phototropism

ignore cell division

1

[12]

5.

(a) (i) receptor

allow named receptor eg light receptor

ignore sensory neurone

allow sense organ / named sensory organ eg skin / eye

1

(ii) sensory (neurone)

allow afferent

1

(iii) motor (neurone)

allow efferent

1

(iv) effector / muscle / gland / named

1

(b) any **two** from:

- impulse / information passes from one neurone to another
or impulse / information passes across gap
- chemical / transmitter involved
- diffusion (across gap)

2

(c) brain / person not aware of pain / stimulus / can't feel
allow brain/ person doesn't know / realise / unable to coordinate
ignore reflex
ignore information

1

possibility of (permanent / serious) damage / eg burning
ignore danger

1

[8]

6.

(a) receptors detect / sense stimuli / change in surroundings **or** convert stimulus into an impulse

ignore send impulses to brain / spinal cord

1

example of a receptor

allow any appropriate organ or part of an organ, eg eye / retina or
named type of receptor eg light receptor

1

effectors allow / make response **or** convert an impulse to an action

ignore receive impulses from brain / spinal cord

1

(effector) muscle / gland

allow an example

ignore eg arm / leg

1

(b) (i) junction

allow idea of a (small) gap / space

*do **not** allow if implication is that the neurones move*

1

between neuron(e)s

allow named types of neurones

1

(ii) chemical

allow answers in terms of specific types of neurone

allow neurotransmitter / named neurotransmitter released

1

any **one** from:

- (chemical released) from one neurone
ignore produced
- (chemical) passes (across synapse) to next neurone to stimulate / cause (electrical) impulse
allow diffuses for passes (across)

1

- (c) (i) skin
ignore hand / leg 1
- (ii) 1.6 (cm per millisecond)
allow 2 if evidence of rounding up of 1.6 1
- (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
- 7.** (a) times are very short / in milliseconds
or
milliseconds cannot be measured with a stopwatch 1
- (b) to increase validity / repeatability
or
to get representative results
allow to give a more reliable mean value 1
because of variation in results
allow to identify any anomalies 1
- (c) (they have included) 468 / the 7th result
allow identification of anomaly in the table 1
(which) is anomalous / is a much higher value (than the others) 1
- (d) $\frac{275}{259}$
1.06 (: 1)
an answer of 1.06 (: 1) scores 2 marks 1
allow max 1 mark if wrong number of sig. figs. 1
- (e) 2.59×10^{-1} seconds 1

[12]

- (f) any **two** from:
- cannot compare mean to **B** as it has been incorrectly calculated
 - **C**'s mean reaction time is the longest, not the shortest
 - only measured one type of reaction
- or**
- cannot generalise to all reaction types
 - other factors can influence reaction time
- allow examples*

2

- (g) involves (the conscious part of) the brain
- allow voluntary (re)action*

1

[11]