

MARK SCHEME

GCSE

BIOLOGY

AQA - COMBINED SCIENCE

B 5 - TEST 5

HOMEOSTASIS AND RESPONSE

Advanced

Mark schemes

1.

idea:
glucose level rises
pancreas releases insulin
glucose → glycogen (in liver)/removes xs glucose
glucose level falls/returns to normal

for 1 mark each

[4]

2.

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

- same test being repeated
- test number not a dependent variable / variable being tested
- test number is not a continuous variable
allow test number is a categoric variable
allow data is categoric

1

(ii) ignore / repeat anomalous result

1

calculate means (for each sense organ)

allow average

1

(b) any **one** from:

ignore figures

- eyes have longest reaction time
allow slowest
- ears have shortest reaction time
allow fastest
- ears and skin have similar reaction times
ignore references to anomalies / repeat values / test numbers

1

[4]

3.

(i) eyes as sense organs/detector/receptors in eye,
electrical signals (impulses),
to co-ordinator,
then to leg muscles/effector

for 1 mark each

4

- (ii) affects the nervous system and slows down the reactions
for 1 mark

1

[5]

4.

- (a) any **four** from:
- the woman is given FSH / LH
allow fertility drug
*do **not** allow an incorrect hormone eg oestrogen*
 - (FSH / LH / hormones) to stimulate egg maturation / release / production
 - eggs **and** sperm are collected / mixed
 - fertilisation happens
 - embryo(s) form
 - (embryo(s)) inserted into the woman's uterus / womb.
this complete statement gains 2 marks

4

- (b) **three** arguments given from:
*arguments for **and** against required for full marks*

Arguments for:

- older women (may) have more money / time to support the child
- older women may make better parents
allow examples of maturity / life experiences
- allows women who have late marriage / partnership to have a family.

Arguments against:

- mother may die before child has grown up
- baby may not be as healthy
allow (higher) risk of genetic disorders / down's syndrome
- mother may have more problems during pregnancy / birth
- mother might have less energy (than a younger mother) to look after a child.

3

[7]

5.

- (a) maintains the lining of the uterus

1

suppresses FSH

1

- (b) (sudden) drop in progesterone

1

causes the lining of the uterus to break away

1

(c) FSH (injections) stimulate the growth / maturation of eggs (to be fertilised)

1

FSH stimulates oestrogen release

1

(which) stimulates uterus lining to develop (for the fertilised egg to implant into)

allow oestrogen stimulates LH production / release

1

LH stimulates ovulation / egg release

1

[8]

6.

(a) $\frac{33}{72}$

or

0.45833...

allow $\frac{34}{72}$

or

0.47222...

1

0.46 (arbitrary units per hour)

allow 0.47 (arbitrary units per hour)

allow an answer given to 2 significant figures from an incorrect calculation in step 1 for 1 mark

1

- (b) any **five** from:
- (during the first days of the cycle) FSH from the pituitary stimulates an egg / follicle to mature
 - FSH stimulates oestrogen from the ovaries
 - oestrogen causes thickening of the uterus lining (in the first half of the cycle)
 - oestrogen inhibits FSH but stimulates LH from the pituitary
 - the high levels of LH stimulate release of the egg / ovulation (on day 14))
 - progesterone is secreted by the (empty) follicle / corpus luteum (after day 14 / ovulation)
 - progesterone maintains the lining of the uterus (during the second half of the cycle)
- or**
- progesterone inhibits both FSH and LH
 - progesterone falls (if no pregnancy happens) and uterus lining comes away as the menstrual blood flow

if no other marks awarded allow 1 mark for oestrogen and progesterone are produced by the ovaries and FSH and LH are produced by the pituitary

5

points must be in correct order to gain full credit

- (c) any **one** from:
- (lower dose so) fewer side effects
 - (patch lasts longer so) don't have to remember to take pill every day
 - hormone (from patch) goes directly into bloodstream so (contraception) unaffected by vomiting

1

[8]

7.

- (a) hormone
ignore protein

1

- (b) (once a certain amount of thyroxine has been produced)
(thyroxine) inhibits / prevents / stops (pituitary gland from) stimulation of the thyroid gland
so less thyroxine is produced

1

1

(c) cold weather stimulates the pituitary gland, which stimulates the thyroid gland to produce more thyroxine

1

increased / more thyroxine raises basal metabolic rate

1

which increases rate of respiration, which increases body temperature

1

(d) less stimulation of thyroid gland, so less thyroxine produced / released

1

so basal metabolic rate decreases

1

therefore reduced respiration rate, so more food stored as fat

1

[9]

8.

(a) (P) synapse

1

(Q) relay neuron(e)

allow intermediate neuron(e)

1

allow phonetic spelling

(b) (in neurone) as electrical impulse

allow electrical potential

ignore signal / message

1

(across synapse / gap P) as diffusion / movement of chemical / neurotransmitter

1

if no mark awarded allow 1 mark for mention of electrical and chemical in that order

(c) the impulse has to travel to the brain (and back)

allow it needs time to be processed by the brain

allow the pathway is (a lot) longer

allow more synapses

1

(d) $120 = \frac{1.6}{\text{time}}$

or

evidence of: $\text{speed} = \frac{\text{distance}}{\text{time}}$

1

0.013(33...)(s) or $\frac{1}{75}$

1

13(.33...) (ms)

an incorrect answer correctly converted to ms scores 1 mark

1

- (e) as age (in years) increases the time for the muscle to contract increases
do not accept directly proportional

1

at an increasing rate

allow correct description of 'at an increasing rate'

1

[10]

9.

- (a) (i) • blood sugar rises because
• insufficient insulin secreted by body
for 1 mark each

2

- (ii) • increase in rate of conversion
• of glucose to glycogen
• in liver
for 1 mark each

3

- (iii) • muscles use more glucose from blood
• in respiration
• to release energy needed for exercise
for 1 mark each

3

- (b) 3 of
sugar soluble
therefore absorbed
quicker than starch
which has to be digested
any 3 for 1 mark each

3

- (c)
- increased secretion of glucagons
 - by pancreas
 - results in increases rate of conversion of glycogen into glucose
- for 1 mark each*

3

- (d) 3 of e.g.
- higher blood sugar level results in increased secretion of insulin
effect of insulin is to lower blood sugar
which in turn reduces rate of insulin secretion
overall result is to keep fluctuations in sugar level to a minimum
- any 3 for 1 mark each*

3

[17]