

Hormonal Coordination in Humans

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science – Trilogy - Biology
Exam Board	AQA
Topic	4.5 Homeostasis and Response
Sub-Topic	Hormonal Coordination in Humans
Difficulty Level	Silver Level
Booklet	Mark Scheme 1

Time Allowed: 52 minutes

Score: / 48

Percentage: /100

Grade Boundaries:

M1.(a) any **two** from:

- same result at pH 7 and 7.5
or
could be any pH between 7 and 7.5
or
not tested at pH 7.25
or
need to test at smaller pH intervals (between 7 and 7.5)
- accuracy of result only to nearest 0.5 minutes
- no repeats
- difficult to determine end point (colour)

2

(b) 2.7 / 5

1

0.54 (units per minute)

allow 0.52 with no working shown for 2 marks

1

*allow 1 mark for 0.52 **or** 0.56*

(c) (after 10 minutes) solution goes black

1

(after 60 minutes) solution stays the same

or

does not go black

or

goes slightly orange

1

(d) steeper curve

1

levels off at 11.8 units **and** before 45 minutes

1

(e) no / little sugar produced

allow a correct description of what the graph would look like

1

(because at 65 °C) the enzyme will be denatured

allow (because) the enzyme's shape will be changed

or

(because) the active site is damaged

1

(so) will no longer fit the starch

or

(so) will not be able to catalyse the reaction

1

[11]

M2.(a) products below reactants

1

correct energy profile

1

activation energy correctly labelled

1

energy given out correctly labelled

1

(b) 31 (%)

1

- (c) the products would be above the reactants

1

- (d) catalysts increase rate of reaction

1 mark for each property

1 mark for each explanation

so products formed in less time

or

catalysts lower activation energy

explanation must be linked correctly to the property to gain the mark

so lowers energy requirements

or

catalysts not used up in the reaction

so only an initial outlay needed

or

only a small amount of catalyst needed

so small initial cost

max. 4

- (e) Protein

1

- (f) high temperatures

1

extremes of pH

1

- (g) lactase acts as the lock, lactose is the key (substrate)

1

lactase has an active site which will only fit lactose molecules

1

so lactase will not work with other molecules

1

[16]

M3.(a) 6.1 circled on table (15 °C, test 1)

1

(b) 1.8

do not allow 1.83

1

(c) 16 (minutes)

correct number extrapolated from curve

1

(d) 4.0 min – blue / black / purple

1

7.0 min – yellow / orange / brown

1

(e) The amylase solution had been prepared with water at 95 °C

1

1

(f) **Level 3 (5–6 marks):**

A clear and coherent method is described using logical steps and demonstrating a good understanding of how to improve the validity of the method. The method would lead to

the production of valid results that would give rise to a more valid conclusion.

Level 2 (3–4 marks):

The substantive content of a method is present and demonstrates reasonable understanding of how to improve the validity but may be missing some detail. The plan

may not be in a completely logical sequence but leads towards the measurement of rate of the reaction.

Level 1 (1–2 marks):

Simple relevant statements made, which demonstrate limited understanding of how to improve the experimental method. The response lacks logical structure and would not

lead to the production of valid results or a more precise optimum temperature.

0 marks:

No relevant content

Indicative content

- conduct at a greater range of temperatures
- use temperatures both above and below 40 °C
- use smaller temperature intervals to get a more accurate optimum (eg go up in 2 °C increments)
- take samples at smaller time intervals to get a more accurate result for 'time taken'
- control the volume of starch used (eg 5 cm³)
- control the volume of the amylase solution (eg 1 cm³)
- control the temperature (eg using a water bath)
- heat the two solutions separately before mixing
- control the concentration of the starch solution
- control the concentration of the amylase solution

6

[13]

M4.(a) (i) chemical

1

(ii) pituitary gland

1

(b) 8

allow 9 or 10

1

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

- progesterone starts being produced at 4 weeks / no progesterone before 4 weeks
- and then / from 4 weeks increases
- oestrogen at constant / low level (from 0) to 20 weeks
- and then / from 20 weeks increases
- from 20 – 36 weeks level of O rises more steeply than that of P

or

- P is always higher than O from 6 to 36 weeks
if no other marks awarded, allow progesterone and oestrogen both increase / rise for 1 mark.

4

(ii) oxytocin

1

level of oxytocin increases just before birth

1

[9]