

Animal Tissues, Organs and Organ Systems

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Biology
Exam Board	AQA
Topic	4.2 Organisation
Sub-Topic	Animal Tissues, Organs and Organ Systems
Difficulty Level	Silver Level
Booklet	Mark Scheme 1

Time Allowed: 52 minutes

Score: /50

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

[8]

M2.(a) any **two** from:

- to work out the correct dose to be given
- to check that the drug is working correctly
- to check for toxic effects.

2

(b) patients are randomly allocated to receive statin or a placebo

1

so neither patient nor doctor knows who has received which

1

answer in terms of only the drug company knows who is taking the statin or the placebo gains 2 marks

(c) To prevent false claims

1

(d) drug **A** reduced the blood cholesterol level more than drug **B**

1

drug **A** reduced the thickness of the artery **or** drug **B** increased the thickness of the artery

allow drug A made the artery thinner or drug B made the artery thicker

1

ignore side effects

(e) differences in number of patients reporting side effects are very similar

1

we don't know what the patients died of

1

[9]

M3.(a) 55%

2 marks for correct answer alone

accept 54 – 56

5.5 / 10 × 100 alone gains 1 mark

2

(b) any **three** from:

- amino acids
- antibodies
- antitoxins
- carbon dioxide
- cholesterol
- enzymes
- fatty acid
- glucose
- glycerol
- hormones / named hormones
- ions / named ions
- proteins
- urea
- vitamins
- water.

ignore blood cells and platelets

ignore oxygen

max 1 named example of each for ions and hormones

allow minerals

3

(c) 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 refer to the information in the Marking Guidance and apply a 'best-fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1 – 2 marks)

There is a description of pathogens with errors or roles confused.

or

the immune response with errors or roles confused.

Level 2 (3 – 4 marks)

There is a description of pathogens **and** the immune response with some errors or confusion

or

a clear description of either pathogens **or** the immune response with few errors or little confusion.

Level 3 (5 – 6 marks)

There is a good description of pathogens **and** the immune response with very few errors or omissions.

Examples of biology points made in the response:

- bacteria and viruses are pathogens
credit any ref to bacteria and viruses
- they reproduce rapidly inside the body
- bacteria may produce poisons / toxins (that make us feel ill)
- viruses live (and reproduce) inside cells (causing damage).

white blood cells help to defend against pathogens by:

- ingesting pathogens / bacteria / (cells containing) viruses
credit engulf / digest / phagocytosis
- to destroy (particular) pathogen / bacteria / viruses
- producing antibodies
- to destroy particular / specific pathogens
- producing antitoxins
- to counteract toxins (released by pathogens)
credit memory cells / correct description
- this leads to immunity from that pathogen.

6

[11]

- M4.(a)** 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 refer to the information in the Marking guidance and apply a 'best-fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1–2 marks)

The method described is weak and could not be used to collect valid results, however does show some understanding of the sequence of an investigation.

Level 2 (3–4 marks)

The method described could be followed and would enable some valid results to be collected, but lacks detail.

Level 3 (5–6 marks)

The method described could be easily followed and would enable valid results to be collected.

Examples of the points made in the response:

- bean seedlings of same age
- cut material from same part of each organ (for repeats) e.g. top 1 cm of stem / a whole cotyledon / seed
- equal mass of each organ

accept weight for mass

- grind / homogenise
- in equal amounts of water / buffer
- equal volumes of hydrogen peroxide solution
- equal concentrations of hydrogen peroxide solution
- same temperature
- temperature maintained in water bath
- quantitative measure of gas production eg height of foam in mm / collect gas in graduated syringe in cm³
- for same time period
- repetitions (3+ times)
- calculate mean for each.

6

(b) (i) correct answer: 40

1 mark for 45 as the anomalous result has been included in the calculation

or

$$(38 + 41 + 42 + 39)$$

1 mark for $\frac{\quad}{4}$

$$\frac{160}{\quad}$$

or $\frac{\quad}{4}$

2

(ii) vertical axis correctly labelled:
'Enzyme activity in arbitrary units'

allow ecf from (b)(i)

1

points plotted correctly ± 1 mm

deduct 1 mark for each incorrect plot

2

suitable line of best fit

not feathery, not point to point

1

(iii) 6.0 / 6

allow ± 0.1

if 6.0 not given, allow correct for candidate's graph ± 0.1

1

(iv) in range 0 to 14 units

allow correct for candidate's graph

1

(v) enzyme denatured / enzyme (active site) shape changed

allow substrate no longer fits (active site)
ignore reference to temperature
do not allow enzyme dies

1

[15]

M5.(a) (i) glycerol

1

(ii) pancreas / small intestine
accept duodenum / ileum
ignore intestine unqualified

1

(b) any **two** from:

- type of milk
- volume / amount of milk
- vol. bile equals vol. water
- volume of lipase
- concentration of lipase
- temperature

ignore time interval

ignore solution unqualified

*do **not** allow pH*

ignore starting pH

ignore volume / amount of bile / water

ignore concentration of bile

accept amount of lipase if neither volume nor concentration given

2

(c) (i) fatty acid (production)

1

(ii) faster reaction / digestion (with bile)

or

pH decreases faster (with bile)

or

takes less time (with bile)

or

steeper fall / line (with bile)

allow use of data

ignore easier

1

- (iii) all fat / milk digested
or
same amount of fatty acids present
or
(lower pH) denatures the enzyme / lipase
allow all reactants used up
ignore reference to neutralisation
allow enzyme won't work at low pH
do **not** allow enzyme killed

1

[7]