

MARK SCHEME

GCSE

BIOLOGY

AQA - COMBINED SCIENCE

B 7 - TEST 5

ECOLOGY

Advanced

Mark schemes

1.

idea

- banded snails camouflaged/less easily seen
- fewer banded eaten [by birds]
- more banded survive to breed
- more genes for banded passed on
or more banded snails in population

for 1 mark each

N.B.

Accept reverse of all above for plain snails

*All 4 marks may be gained by a relatively short response

[4]

2.

(a) extremophile(s)

1

(b) (i) common (periwinkle) and flat (periwinkle)

*either order, **both** required*

1

(ii) (common and flat) both live in the same habitat / area / named area

allow habitats overlap the most

1

(iii) any **two** from:

- would have wrong food
- would otherwise be exposed to (specific) predators
- cannot tolerate extended exposure to air **or** reduced submersion in seawater
allow cannot tolerate temperature / dehydration
- cannot tolerate high salt concentration (in rock pools)
allow low salt concentration (in rock pools)
- cannot compete with small periwinkle

2

[5]

3.

(a) wing pattern similar to *Amauris*

1

birds assume it will have foul taste

1

- (b) mutation / variation produced wing pattern similar to *Amauris*
do **not** accept breeds with *Amauris*
do **not** accept idea of intentional adaptation

1

these butterflies survived

1

breed / genes passed to next generation

1

[5]

4.

plants absorb CO₂ for photosynthesis
ignore carbon

1

all organisms / any named organism respire(s) and release(s) CO₂
ignore breathing
ignore carbon

1

any **four** from:

- carbon compounds / named compound made by plants
- plants eaten by animals
- dead organisms / faeces are decomposed / decayed
allow broken down
- by bacteria / microorganisms
- dead plants and animals (may) form fossil fuels
- when (fossil) fuels are burnt they release CO₂ into the air

4

[6]

5.

Level 3 (5–6 marks):

A full explanation is given that is coherent and logically structured, linking effect of increase in carbon dioxide to climate change and effects on biodiversity.

Level 2 (3–4 marks):

An attempt is made to link the effects of rising carbon dioxide levels to climate change and biodiversity. The logic may be inconsistent at times but builds towards a coherent explanation.

Level 1 (1–2 marks):

Discrete relevant points made. The logic may be unclear and attempts at reasoning may not be consistent.

0 marks:

No relevant content.

Indicative content

- rise in carbon dioxide increases atmospheric temperature / causes global warming
- global warming causes extreme weather patterns
- such as rise in sea levels
- increased or decreased rainfall
- frequency of storms / droughts
- rise in sea levels means habitats will change due to flooding
- rise in sea levels could increase salt in soil
- increased rainfall will increase water levels
- severity of storms / droughts could affect photosynthesis
- consequences of changes are loss of or damage to habitats
- which will affect animal and plant distributions
- by increasing migration or species dying off
- which decreases biodiversity

[6]

6.

- (a) 3060 (kJ) 1
- (b) (i) 22060 (kJ) 1
- (ii) photosynthesis 1
- (c) faeces / undigested food
reference to movement and respiration are neutral
- urine / urea 2
- accept excretion / waste / droppings if
both of the mark points are not gained*

(d) any **two** from

- control ripening
 - herbicides
 - prevent over ripening in transport
 - stimulate root growth
- other growth references are not neutral*
- use in tissue culture to produce large numbers of plantlets

2

[7]

7.

(a) e.g.
timber
agriculture
roads / urban development / buildings

any two for 1 mark each

2

(b) *ideas that (accept reverse arguments)*
increased carbon dioxide content since less during photosynthesis
and locked-up as wood burning increases carbon dioxide content
increased activity of microbes increases carbon dioxide content
oxygen content reduced water vapour content reduced

any five for 1 mark each

5

[7]

8.

(a) any **three** from:

- blackbirds seen in higher % of / more gardens
 - multiplying mean number by percentage of gardens seen in shows blackbird is higher
- allow 1 additional mark for correct figures showing this, ie 264
sparrows: 305 blackbirds*
- only done on one day / month / hour
- eg only done in January*
- only done in gardens (one bird may prefer a different habitat)
 - problem of (correct) identification
 - may re-count same ones
- if neither point 5 or 6 given allow 1 mark for idea of error /
miscounted*
- people may quote false numbers / may make it up

3

(b) (i) 60.3

*award 2 marks for correct
answer, irrespective of working
award 1 mark for $33.5 + (33.5 \times 80 / 100)$ or equivalent with no
answer or incorrect answer **or** award 1 mark for 26.8*

2

(ii) any **two** from:

- change in temperature
a comparison is required
eg cooler / warmer / less frost (in 2012)
- fewer predators
- more food **or** less competition for food
- more nesting space **or** less competition for nesting space
- less disease (in 2012)
allow idea that people may be better / worse at identifying birds / goldfinches
allow idea of movement to gardens (due to poor food supply elsewhere)

2

[7]

9.

- (a) e.g.:
competition for light because potamogeton plants taller
competition for nutrients taller plants may have longer roots
each for 1 mark

4

- (b) descriptions of:
measuring tape or similar quadrat
method of estimating cover (inside quadrat)
each for 1 mark

3

[7]

10.

- (a) 6

1

- (b) only one species present

1

- (c) (abiotic)
any **one** from:
- temperature
 - exposure to the air / moisture / water / tides
 - waves / wind
 - rock type / substrate

1

- (biotic)
any **one** from:
- competition
 - predators
 - food

1

- (d) select location for transect at random / to be representative 1
- transect / tape measure / line from top of shore / beach to sea 1
- counting which species touched transect / regular use of quadrat along transect to count species 1
- ignore repeat unqualified*
- repeat at other locations on same beach/shore 1
- allow repeat at another time of year*
- or repeat at low / high tide*

[8]

11.

- (a) availability of food 1
- new diseases 1
- (b) (sampling has been used) so not all mice / voles / owls are counted
or
 some mice / voles / owls won't have been caught **or** were hidden 1
- allow idea of animals (constantly) moving around*
- (sampling has been used) so some counted more than once
if no other marks awarded allow we don't know the sampling method used 1
- (c) line rises and falls 1
- rise and fall pattern is below the line for mice and voles (throughout graph) 1
- rise and fall pattern is after the corresponding rise and fall for mice and voles (from first trough onwards) 1

(d) (voles decrease / drop)

(because) less mice for the owls to eat

1

(therefore) owls eat more voles

*allow for 2 marks (decrease) because they are the only /
main source of food for owls*

1

or

(voles increase / rise)

(because) more food is available (1)

(because) mice are not eating it (1)

*no mark for decrease / increase
mark as pairs with correct increase / decrease given*

[9]