# GCSE

## BIOLOGY

## AQA - COMBINED SCIENCE

## MARK SCHEME

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B7

ADAPTATIONS & ECOLOGY

TEST 1

**1** (a) looks like a leaf

1

so predator less likely to / won't see it

*allow 'camouflage' as alternative to either point*

1

(b) (i) thorns (of acacia tree) hurt (predators)

*allow idea that fewer animals / predators live in trees **or** ground living animals can't reach them (in the trees)*

1

(ii) (giraffe) avoids being bitten by ants

*allow ants are poisonous / have unpleasant taste*

1

(c) looks like / mimics a wasp **or** has warning colouration

1

so predators think it has a sting

1

**[6]**

**2** (a) chose places randomly

1

method of obtaining randomness, e.g. (grid and) random numbers

*allow thrown qualified e.g. over shoulder, eyes shut*

*allow max 1 for mention of a transect with sampling at regular or random intervals*

1

(b) (i) 7 **or** 8

*allow fractions / decimals between 7 and 8*

1

(ii) count number of whole squares and add estimate of area covered by part squares

*allow reference to counting squares with ½ cover or more*

*allow clear working on diagram and / or (b)(i)*

1

(iii) 28 – 32 (in range)

*allow ecf*

*if answer incorrect allow **1** mark for reasonable reference to divided by 25 or multiplied by 4*

2

(c) nutrients / minerals / ions / fertiliser / water

*allow light / pH / trampling / soil texture / grazing / mowing / weed killer / where seeds originally fell*

*ignore pollution / soil / competition if unqualified*

*ignore temperature / wind*

1

**[7]**

**3**

(a) C

1

(b) B

1

(c) E

1

(d) D

1

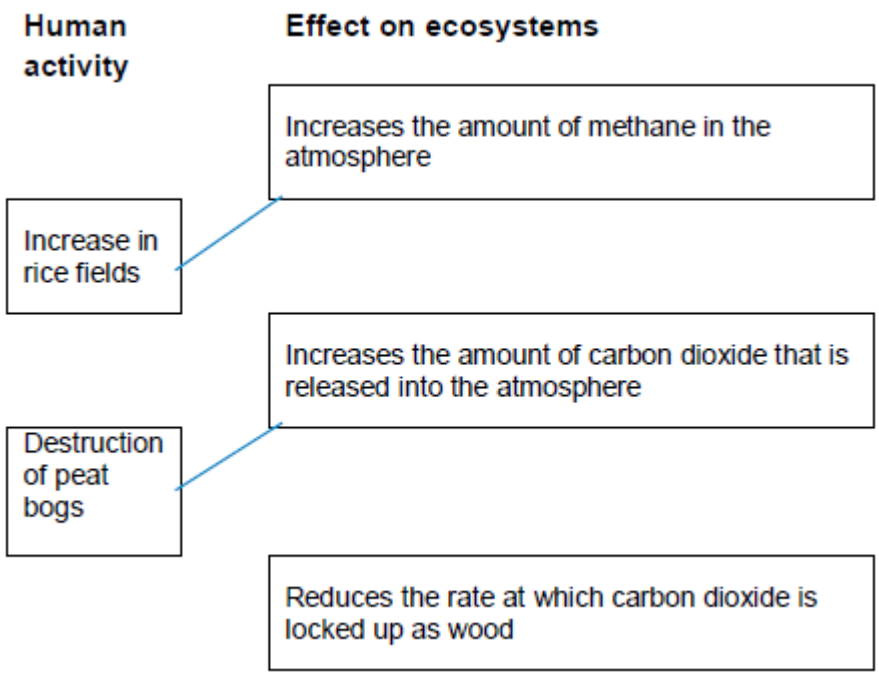
(e) F

1

**[5]**

**4**

(a)




*extra lines from left cancels mark*

2

(b) (i) any **two** from:

- (to provide land) for farming / agriculture
- (to provide land) for quarrying
- (to provide land) for building
- to provide wood for building materials
- to provide fuel
- to provide paper

2

(ii) any **two** from:

- changes in earth's climate, ie droughts, flooding, hurricanes
  *ignore temperature rise*
  *allow ice caps melt*
- rise in sea levels
- reduce biodiversity
- change in migration patterns
- may change distribution of species

*ignore acid rain **and** the ozone layer **and** forest fires*

**2**

**[6]**

**5** (a) (i) forest at the edges (of the island) has been removed

*allow centrally the forest remains*

**1**

an appropriate area on the island is identified eg south east **or** bottom right

**1**

(ii) any **two** from:

- (to provide land) for farming / agriculture
- (to provide land) for quarrying
- (to provide land / wood) for building
  *allow to provide timber*
- to provide fuel
- to produce paper

*allow forest fires*

**2**

(b) any **two** from:

- decreased biodiversity
- loss of habitats
- increased carbon dioxide (concentration)
- global warming

*allow effects of global warming eg flooding / rise in sea level*

*allow soil erosion*

**2**

**[6]**

**6** (a) (i) counts / 12

**1**

× 120 × 80 / × 9600
**or**
× area of field

**1**

(ii) (more) quadrats / repeats

**1**

placed randomly

*ignore method of achieving randomness*

**1**

(b) (i) any **three** from:

- temperature / warmth / heat
- water / rain
- minerals / ions / salts (in soil)

  *allow nutrients / fertiliser / soil fertility*

  *ignore food*
- pH (of soil)
- trampling
- herbivores

  *ignore predators*
- competition (with other species)
- pollution qualified e.g. $SO_2$ / herbicide
- wind (related to seed dispersal).

  *ignore space / oxygen / $CO_2$ / soil unqualified*

**3**

(ii) light needed for photosynthesis

**1**

for making food / sugar / etc.

**1**

effect on buttercup distribution eg more plants in sunny areas / fewer plants in shady areas

**1**

(c) (i) fertiliser / ions / salts cause growth of algae / plants

**1**

(algae / plants) block light

**1**

(low light) causes algae / plants to die

**1**

microorganisms / bacteria feed on / break down / cause decay of organic matter / of dead plants

*do **not** allow germs / viruses*

**1**

(aerobic) <u>respiration</u> (by microbes) uses $O_2$

*do **not** allow anaerobic*

**1**

(ii) sewage / toxic chemicals / correct named example eg metals / bleach / disinfectant / detergent etc

*allow suitable named examples eg metals such as Pb / Zn / Cr / oil / $SO_2$ / acid rain / pesticides / litter*

*ignore chemicals unqualified*

*ignore waste unqualified*

*ignore human waste / domestic waste / industrial waste unqualified*

**1**

(d) (i) 2

**1**

(ii) more food

*allow other sensible suggestion eg more species colonise from tributary streams after forest*

**1**

(iii) number of stonefly species decreases (from **A** to **B** / **B** to **C** / **A** to **C**) as more pollution enters river / less oxygen

*allow fewer species in more polluted water*

*ignore none are found at site C*

**1**

**[19]**

**7** Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information in the Marking guidance.

**0 marks**
No relevant content.

**Level 1 (1-2 marks)**
For at least one process **either** the organism that carries it out **or** the carbon compound used **or** the carbon compound produced is described **or** for at least one organism **either** the carbon compound it uses **or** the carbon compound it produces is described **or** at least one process is named

**Level 2 (3-4 marks)**
For some processes (at least one of which is named) **either** the organisms involved **or** the carbon compounds used **or** the carbon compounds produced are described

**Level 3 (5-6 marks)**
For at least one named process an organism **and** either the carbon compound used for the process **or** the carbon compound produced by the process are described **and** for other processes (at least one of which is named) **either** the organism **or** the carbon compounds used **or** the carbon compounds produced are described (as in Level 2)

**Examples of Biology points made in the response:**

- (green) plants photosynthesise
- photosynthesis takes in carbon dioxide
- (green) plants use carbon to make carbohydrate / protein / fat / organic compounds / named (e.g. enzymes / cellulose)
- animals eat (green) plants (and other animals)
- (green) plants respire
- animals respire
- respiration releases carbon dioxide
- (green) plants and animals die
- microorganisms decay / decompose / rot / break down / feed on dead organisms
- microorganisms respire

**[6]**

**8** (a) **1** mark for each adaptation and **1** mark for its correct linked advantage

- long / thick hair / fur (1) for insulation (1)
  *allow keeps warm*
- small ears (1) for reduced heat loss (1)
- small feet (1) for reduced heat loss (1)
  *ignore wide feet*
  *ignore prevent sinking*
- white fur / coat (1) for camouflage / poor emitter (1)
- small SA/V ratio (1) reduces heat loss (1)
- thick layer of fat (1) insulates / keeps warm (1)

**Max 4**

(b) **1** mark for an adaptation and **1** mark for its correct linked advantage

- horns (1) for defence (1)
- long legs (1) for speed / escape / vision (1)
- light colour (1) for camouflage (1)
  *allow pattern*
- eyes on side of head (1) for wider field of vision (1)
- hooves (1) for speed / escape (1)
- large ears (1) to hear predators better (1)

**Max 2**

**[6]**

**9**

(a) (i) to get data re position of seaweed / of organism

**1**

in relation to distance from sea / distance down shore / how long each seaweed was exposed

**1**

(ii) repeat several times
*minimum = 2 repeats*

**1**

elsewhere along the shore

**1**

(iii) bladder wrack is further up the shore (than the sea lettuce) / exposed for longer
*ignore found in dry areas / on bare rock*

**1**

sea lettuce (only) in rock pools / in the sea / (only) in water

**1**

(b) gets more light / closer to light
*allow better access to $CO_2$*

**1**

(so) more photosynthesis
*allow 1 mark for light for photosynthesis*
*allow 1 mark for $CO_2$ for photosynthesis*
*ignore reference to oxygen for respiration*
*'more' only needed once for 2 marks*

**1**

**[8]**

**10**

(a) wing pattern similar to *Amauris*
*allow looks similar to Amauris*

**1**

birds assume it will have an unpleasant 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 not eaten (by birds)

**1**

these butterflies breed **or** their genes are passed to the next generation

**1**

**[5]**