GCSE BIOLOGY AQA - COMBINED SCIENCE MARK SCHEME

B7 ADAPTATIONS & ECOLOGY TEST 1
Mark schemes

(a) looks like a leaf

so predator less likely to / won’t see it

allow ‘camouflage’ as alternative to either point

(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)

(ii) (giraffe) avoids being bitten by ants

allow ants are poisonous / have unpleasant taste

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

so predators think it has a sting

(a) chose places randomly

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

(b) (i) 7 or 8

allow fractions / decimals between 7 and 8

(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)

(iii) 28 – 32 (in range)

allow ecf

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


(a) C
(b) B
(c) E
(d) D
(e) F


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4 (a)

Human activity

Effect on ecosystems

Increases the amount of methane in the atmosphere

Increase in rice fields

Increases the amount of carbon dioxide that is released into the atmosphere

Destruction of peat bogs

Reduces the rate at which carbon dioxide is locked up as wood

extra lines from left cancels mark

(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
(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

(a) (i) forest at the edges (of the island) has been removed
  
  *allow centrally the forest remains

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

(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

(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

(a) (i) counts / 12

  × 120 × 80 / × 9600

  or

  × area of field

(ii) (more) quadrats / repeats

  placed randomly
  
  *ignore method of achieving randomness
(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*

(ii) light needed for photosynthesis

for making food / sugar / etc.

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

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

(algae / plants) block light

(low light) causes algae / plants to die

microorganisms / bacteria feed on / break down / cause decay of organic matter / of dead plants
  *do not allow germs / viruses*

(aerobic) respiration (by microbes) uses O\(_2\)
  *do not allow anaerobic*

(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*
(d) (i) 2

(ii) more food

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

(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

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

(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

(a) (i) to get data re position of seaweed / of organism in relation to distance from sea / distance down shore / how long each seaweed was exposed

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

elsewhere along the shore

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

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

(b) gets more light / closer to light
  *allow better access to CO₂*

(so) more photosynthesis
  *allow 1 mark for light for photosynthesis*
  *allow 1 mark for CO₂ for photosynthesis*
  *ignore reference to oxygen for respiration*
  *‘more’ only needed once for 2 marks*

(a) wing pattern similar to *Amauris*
  *allow looks similar to *Amauris*
birds assume it will have an unpleasant taste

(b) mutation / variation produced wing pattern similar to *Amauris*

*do not accept breeds with Amauris*

*do not accept idea of intentional adaptation*

these butterflies not eaten (by birds)

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

[5]