

MARK SCHEME

GCSE

BIOLOGY

AQA - TRIPLE SCIENCE

B 7 - TEST 3

ECOLOGY

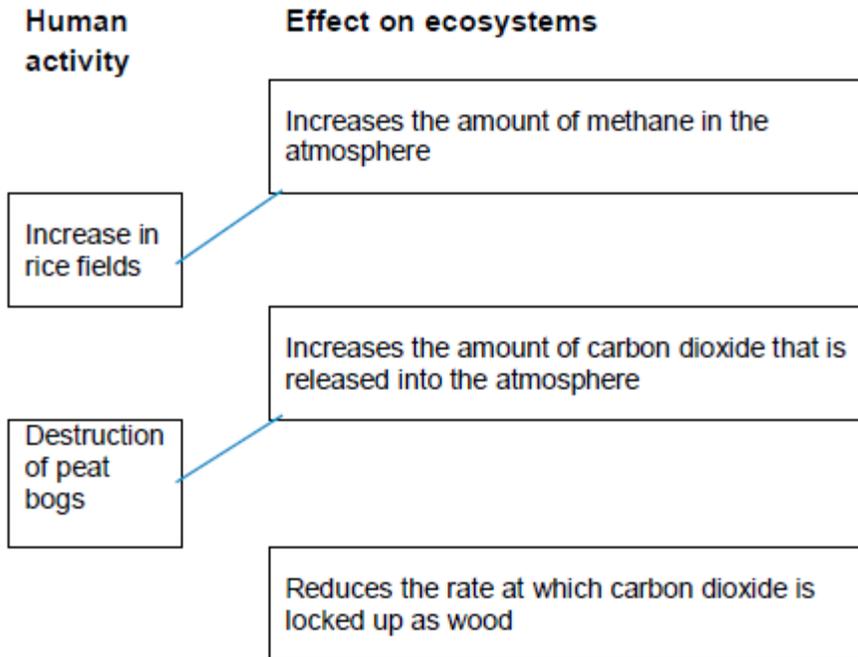
Intermediate

Mark schemes

- 1.** (a) photosynthesis 1
- (b) (i) 140 1
- (ii) (10 billion tonnes) more added (to atmosphere) than removed
allow ecf from part (b)(i) 1
- [3]**
- 2.** (a) (i) fungus 1
- (ii) oxygen / O₂
accept air
accept O₂
do not allow O² / O / O₂ 1
- (iii) glucose (syrup)
allow carbohydrate / sugar
ignore food / starch
allow oxygen if oxygen / air not given in (a)(ii) 1
- (b) any **two** from:
 - quicker
 - suitable for vegetarians
 - cheaper
 - more efficient **or** less land / methane
ignore high in protein
ignore sustainability unqualified
ignore less pollution unqualified
allow less animals harmed / killed
*allow food chain is shorter **or** has less trophic levels*
allow less energy lost (from the food chain)
do not allow no energy lost
allow low(er) in calories (than some meat)
allow low(er) in fat / healthier (than some meat)
allow source of fibre / prevent constipation 2
- [5]**

3.

(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]

4.

(a) methane is produced
ignore bad smell

1

which is a greenhouse gas / causes global warming

1

(b) (9.80 / 0.20 = 49 therefore) 49:1

1

- (c) horse (manure)

allow ecf from 11.2

closest to 25:1 (ratio)

1

- (d) **Level 3 (5–6 marks):**

A detailed and coherent explanation is given, which logically links how carbon is released from dead leaves and how carbon is taken up by a plant then used in growth.

Level 2 (3–4 marks):

A description of how carbon is released from dead leaves and how carbon is taken up by a plant, with attempts at relevant explanation, but linking is not clear.

Level 1 (1–2 marks):

Simple statements are made, but no attempt to link to explanations.

0 marks:

No relevant content.

Indicative content

statements:

- (carbon compounds in) dead leaves are broken down by microorganisms / decomposers / bacteria / fungi
- photosynthesis uses carbon dioxide

explanations:

- (microorganisms) respire
- (and) release the carbon from the leaves as carbon dioxide
- plants take in the carbon dioxide released to use in photosynthesis to produce glucose

use of carbon in growth:

- glucose produced in photosynthesis is used to make amino acids / proteins / cellulose
- (which are) required for the growth of new leaves

6

- (e) any **three** from:

(storage conditions)

- (at) higher temperature / hotter
- (had) more oxygen
- (had) more water / moisture
- (contained) more microorganisms (that cause decay)

allow reference to bacteria / fungi / mould

3

[13]

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) any **two** from:

- sprinkled through air
- air spaces between stones
- thin layer over stones (for efficient diffusion)
- slow flow (for efficient diffusion)

2

(b) green algae

1

(c) (large / small) protist

1

(d) **Level 2 (3-4 marks):**

Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.

Level 1 (1-2 marks):

Facts, events or processes are identified and simply stated but their relevance is not clear.

No relevant content (0 marks)

Indicative content

digestion:

- (external) enzymes released
- role of enzymes – e.g. amylase / protease / lipase
- substrates & products – e.g. starch → sugar / protein → amino acids / fat → fatty acids

absorption:

- by diffusion / active transport

deamination:

- amino acids → ammonia / ammonium ions

release of other ions:

- e.g. phosphate / nitrate / magnesium

respiration:

- produces carbon dioxide (+ water)
or
equation is given
- release of energy allows other processes to take place e.g. active transport

[8]

7.

(a) microorganisms

allow microbes / bacteria / fungi / decomposers

1

(microorganisms) respire

*do **not** allow dead plants respire*

1

(respiration / decay / microorganisms) releases (thermal) energy / 'heat'

ignore produce 'heat'

*do **not** allow produce energy*

*do **not** allow dead plants release 'heat'*

1

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

- (opening) allows oxygen in
- microorganisms / eggs need oxygen
allow air for oxygen
- oxygen needed for respiration
- (opening) allows release of carbon dioxide (from microorganisms / respiration / eggs)
allow gaseous exchange (1 mark) of / for microorganisms / eggs (1 mark) if none of first four points given
- (opening) allows energy / 'heat' to escape
- (closing) retains energy / 'heat' if too cool / at night
*if no mark awarded for either of these points allow 1 mark for vents open in the day to prevent overheating **and** close at night to prevent it getting too cold*
- (closing) retains moisture
allow (opening) releases moisture

3

- (ii) any **one** from:
- maintains sex balance
e.g. equal / best / correct numbers of male and female
 - (survival of species depends on there being) males and females in population
allow so the offspring are not all the same sex

1

[7]

8.

- (a) (i) any **two** from:

- burning (fossil) fuels / one named example
allow combustion / driving cars
accept breathing
- deforestation / described
do not allow power stations unqualified
- destruction of peat bogs

2

- (ii) any **two** from:

B, C, D

in any order

2

- (iii) B

1

- (b) (i) with worms: 90

1

without worms: 78

1

- (ii) increase

1

- (iii) 6 mm mesh is large enough to let (more / bigger) worms in

allow converse for 1.5 mm mesh

1

worms entering increased breakdown

or ate more leaves

1

- (iv) breakdown occurs with 1.5 mm mesh (which is smaller than worms)

1

breakdown with no worms $\approx 70\%$ / $\approx 30\%$ remaining

allow a lot / most breakdown without worms

accept approximate figures

1

[12]

9.

- (a) (rapid) growth in population (size)

1

increase in the standard of living

accept description of increased standard of living, eg more packaging, more food thrown away or overbuying resources

1

- (b) (i) 41.5

allow 1 mark for $9733 \div 23454$

or

allow 1 mark for 0.415

or

*allow 1 mark for 41.49 **or** 41 **or** 41.4*

2

- (ii) any **four** from arguments for:

- there has been a reduction in total waste
- there has been an increase in (total mass of) recycling
- there has been an increase in the percentage of waste recycled
- it (may) not be possible to achieve zero waste.

arguments against:

- there is still a lot of waste (not recycled)
- there has only been a small reduction in total waste
- there was one year (2006) where total waste went up
- the rate of increase of percentage recycled is slowing down
- no information on materials reused
- no information on waste from factories / industry

max 3 marks for a one sided argument

allow as reason against if clear

allow still more than half or 56.8% of waste (not recycled).

4

- (c) (i) any **two** from:
- reduce biodiversity **or** extinction
 - change in migration patterns
 - change in species distribution
 - change in climate
- ignore rise in sea levels*
ignore temperature change
accept correct examples of climate change e.g. storms, flooding, drought
references to weather changing is insufficient
allow ice caps melting or habitat destruction.

2

- (ii) any **one** from:
- absorbed by oceans / ponds / lakes
 - peat bogs
- allow used for skeletons / shells of sea creatures*
allow in fossil fuels / limestone.

1

[11]