OXFORD

INTERNATIONAL AQA EXAMINATIONS

Topic Test: OxfordAQA International GCSE Biology 9201

Ecology

Name: _____

Class: _____

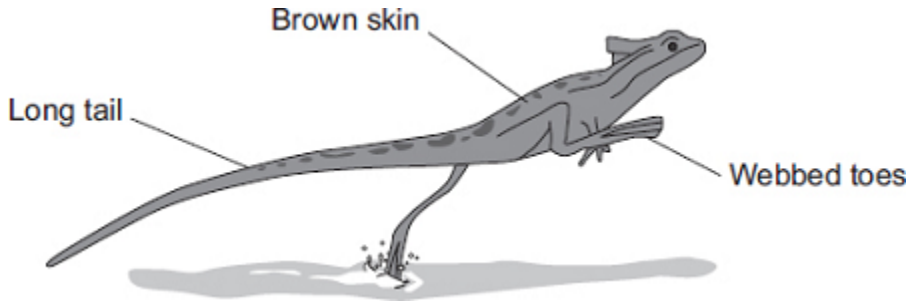
Date: _____

Time: **73 minutes**

Marks: **73 marks**

Comments:

1 The picture shows a basilisk lizard. Some of the adaptations of the lizard are labelled.



Basilisk lizards are often found resting on branches of trees that grow next to water.
Basilisk lizards can run across the surface of the water.

(a) Draw **one** line from each adaptation of the lizard to the advantage of the adaptation.

Adaptation	Advantage
	For camouflage on branches of trees
Toes on the back feet are webbed	
	Helps the lizard to balance when running
Long tail	
	Warning colours to deter predators
Brown skin	
	Increases surface area in contact with the water

(3)

(b) Suggest **one** advantage to the basilisk lizard of being able to run across the surface of the water.

_____

_____

(1)

(c) Animals, such as lizards, compete with each other.

Give **two** factors that animals compete for.

Tick (✓) **two** boxes.

Oxygen ☐

Food ☐

Territory ☐

Light ☐

(2)

(Total 6 marks)

2 Animals and plants are adapted in different ways in order to survive.

(a) Plants may have to compete with other plants.

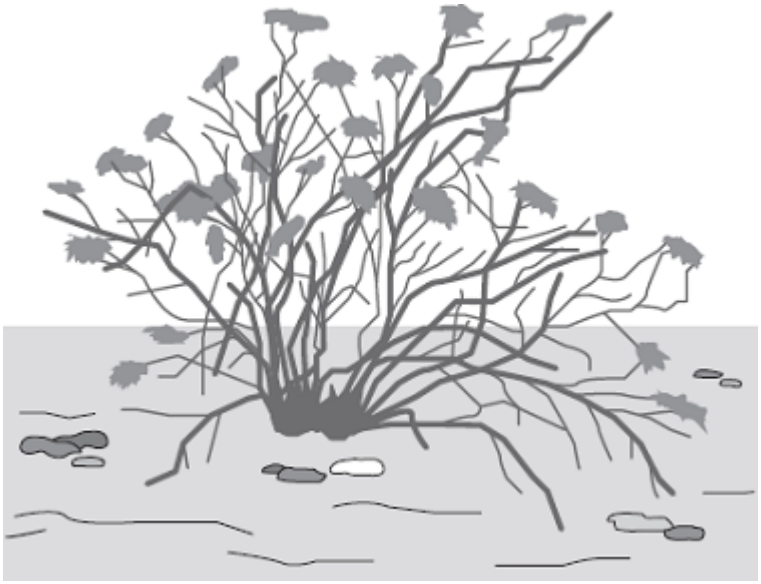
(i) Name **two** things for which plants compete.

1. _____

2. _____

(2)

(ii) The drawing shows a creosote bush.



This bush lives in a desert.

The creosote bush produces a poison that kills the roots of other plants.

How does this poison help the creosote bush to survive in the desert?

_____

_____

(1)

(b) The photograph shows an insect called a katydid.

By Ltshears (Own work) [Public domain], via Wikimedia Commons

The katydid is preyed on by birds.

How does the appearance of the katydid help it to survive?

_____

_____

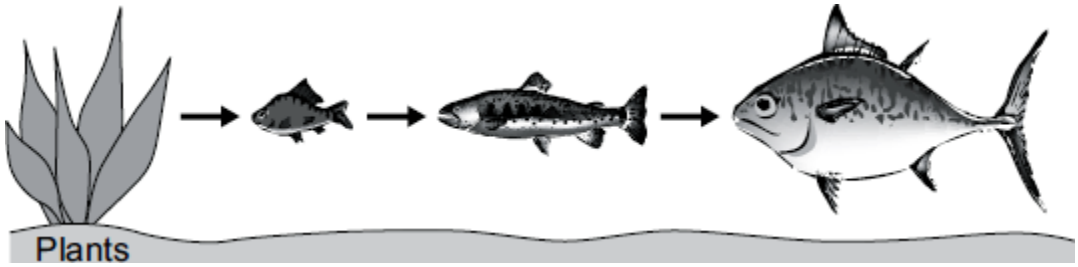
_____

_____

(1)

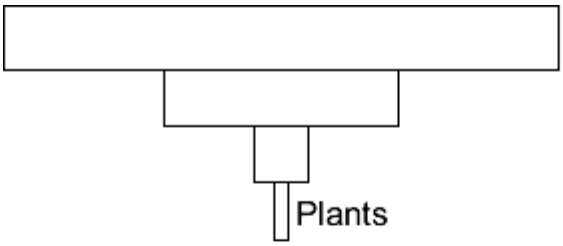
(Total 4 marks)

3 The picture shows a food chain.

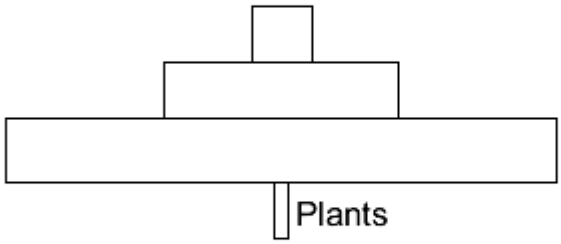


(a) Which diagram shows a pyramid of biomass for the food chain in the picture?

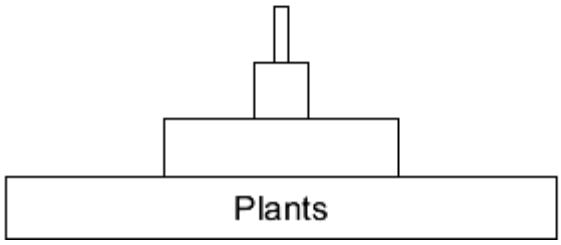
Tick (✓) **one** box.



☐



☐



☐

(1)

(b) The plants at the start of the food chain absorb energy.

Where does this energy come from?

Draw a ring around **one** answer.

the water **the sun** **minerals**

(1)

(c) Some energy is lost at each stage of the food chain.

Give **two** ways in which energy may be lost from the food chain.

1. _____

_____

2. _____

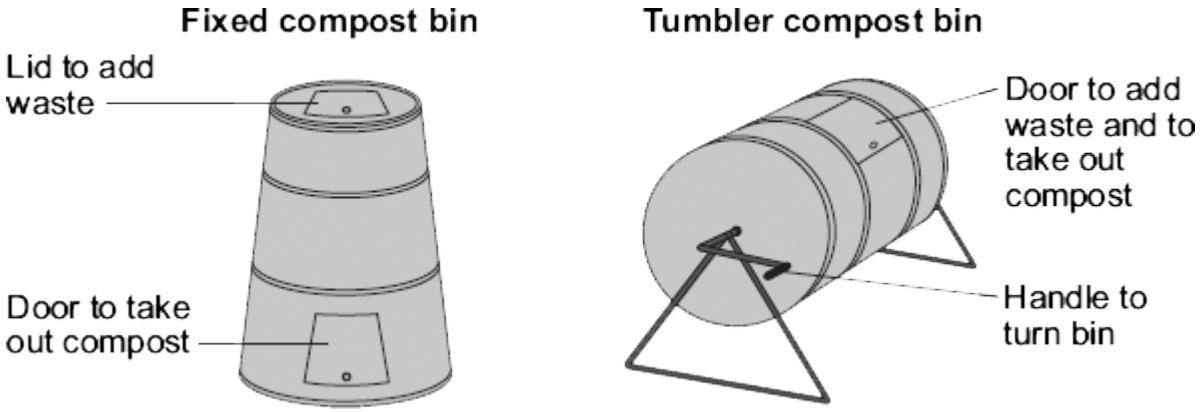
_____

(2)

(Total 4 marks)

4 Garden waste can be recycled.
One way of recycling garden waste is to use a compost bin.

The diagram shows two types of compost bin.
Each bin can contain the same amount of waste.



Information about the compost bins is given below.

Fixed compost bin

- Compost can be taken out after two years.
- The bin costs about £40.
- The bin takes up an area of 1 m^2.

Tumbler compost bin

- The bin is turned twice a day using the handle.
- Six weeks later compost can be taken out.
- The bin costs about £80.
- The bin takes up an area of 2 m^2.

(a) A gardener is buying a compost bin.

(i) Give **one** advantage to the gardener of buying a tumbler compost bin and not a fixed compost bin.

_____

_____

(1)

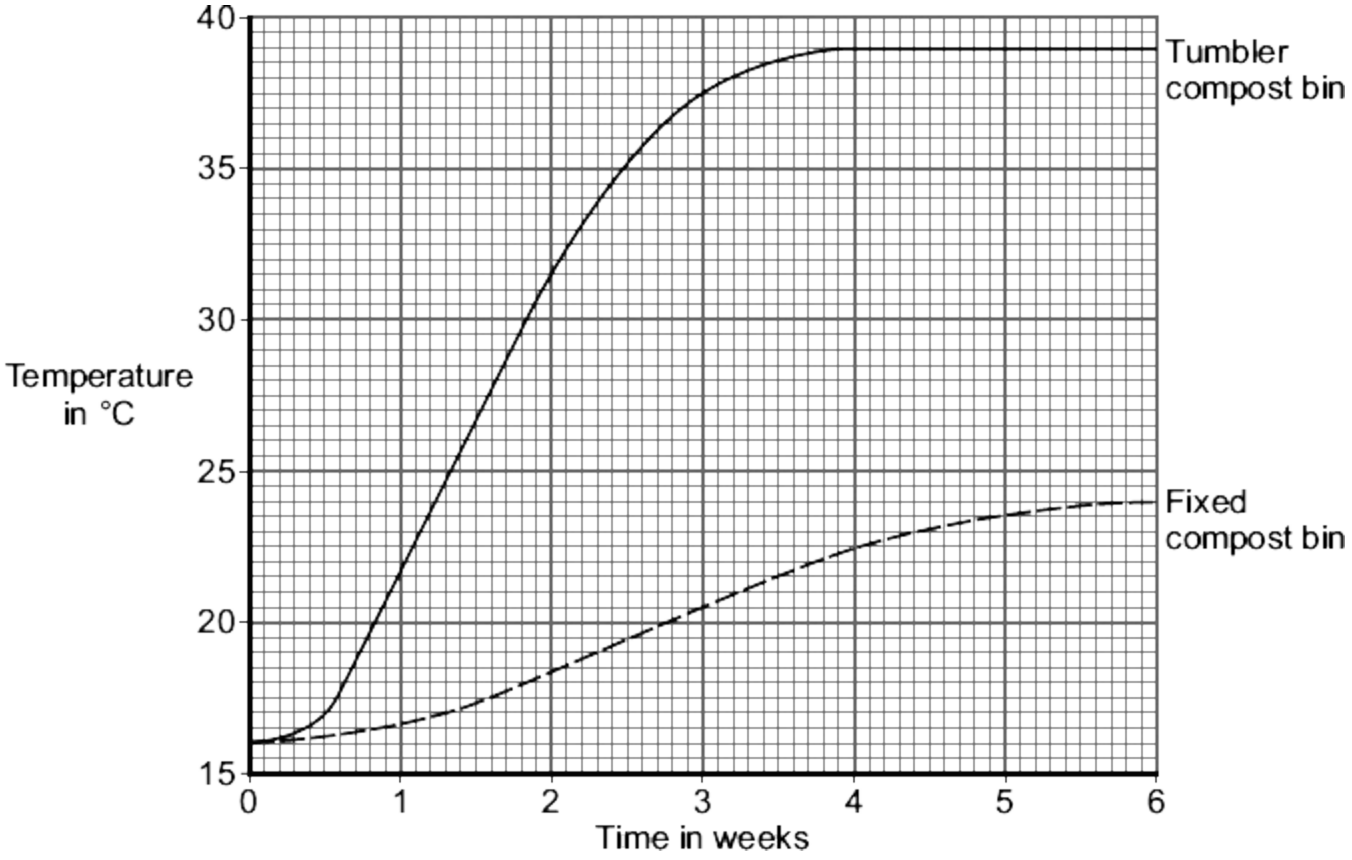
(ii) Give **two** advantages to the gardener of buying a fixed compost bin and not a tumbler compost bin.

1. _____

2. _____

(2)

(b) The same amounts of waste were added to the two types of bin.
The graph shows the temperature in the bins in the first six weeks after the waste was added.



(i) Give **two** differences between the results for the tumbler compost bin and the fixed compost bin.

1. _____

_____

2. _____

_____

(2)

(ii) Complete the sentences.

The waste is converted into compost by organisms

called _____

The conversion of waste into compost works best in warm, moist

and _____ conditions.

(2)

(iii) There was a big difference in the final temperatures in the two bins.

Suggest an explanation for this temperature difference.

_____

_____

_____

(2)

(Total 9 marks)

5 In a woodland, bluebells grow well every year.

Bluebells growing well in woodland

Mick Garratt [CC-BY-SA-2.0], via Wikimedia Commons

Each year the dead flowers and leaves of the bluebells and leaves from the trees fall onto the ground.
The bluebells do not run out of mineral ions.

Explain why the bluebells do **not** run out of mineral ions.

The words in the box may help you.

roots	**dead leaves**	**mineral ions**
microorganisms	**decay**	

_____

_____

_____

_____

_____

_____

(Total 3 marks)

6 Freshwater streams may have different levels of pollution. The level of pollution affects which species of invertebrate will live in the water.

Table 1 shows the biomass of different invertebrate species found in two different streams, **X** and **Y**.

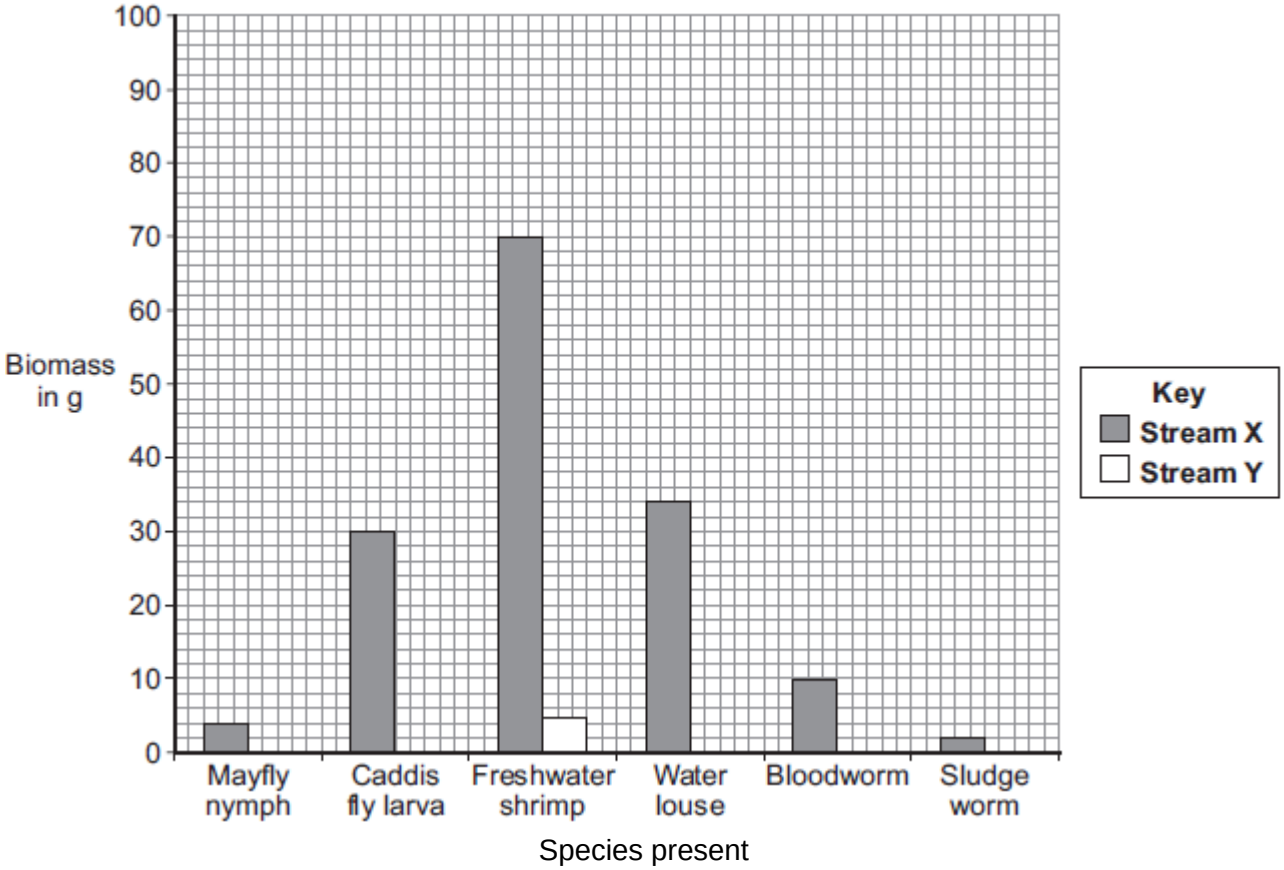
Table 1

	Biomass in g	
Invertebrate species	**Stream X**	**Stream Y**
Mayfly nymph	4	0
Caddis fly larva	30	0
Freshwater shrimp	70	5
Water louse	34	10
Bloodworm	10	45
Sludge worm	2	90
Total	**150**	**150**

(a) The bar chart below shows the biomass of invertebrate species found in **Stream X**.

(i) Complete the bar chart by drawing the bars for water louse, bloodworm and sludge worm in **Stream Y**.

Use the data in **Table 1**.



(2)

(ii) **Table 2** shows which invertebrates can live in different levels of water pollution.

Table 2

Pollution level	**Invertebrate species likely to be present**
Clean water	Mayfly nymph
Low pollution	Caddis fly larva, Freshwater shrimp
Medium pollution	Water louse, Bloodworm
High pollution	Sludge worm

Which stream, **X** or **Y**, is more polluted?
Use the information from **Table 1** and **Table 2** to justify your answer.

_____

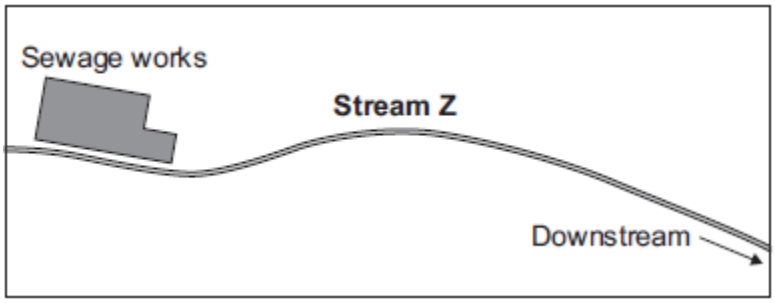
_____

_____

_____

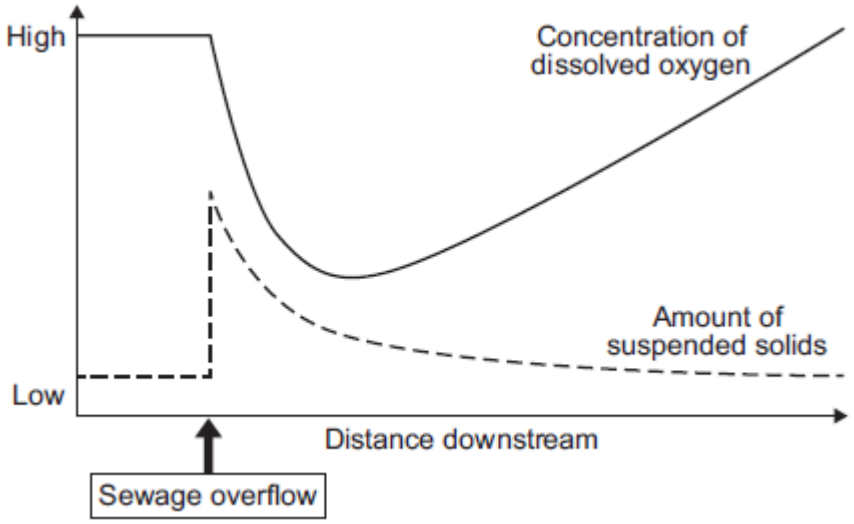
(2)

(b) There is a sewage works near another stream, **Z**.

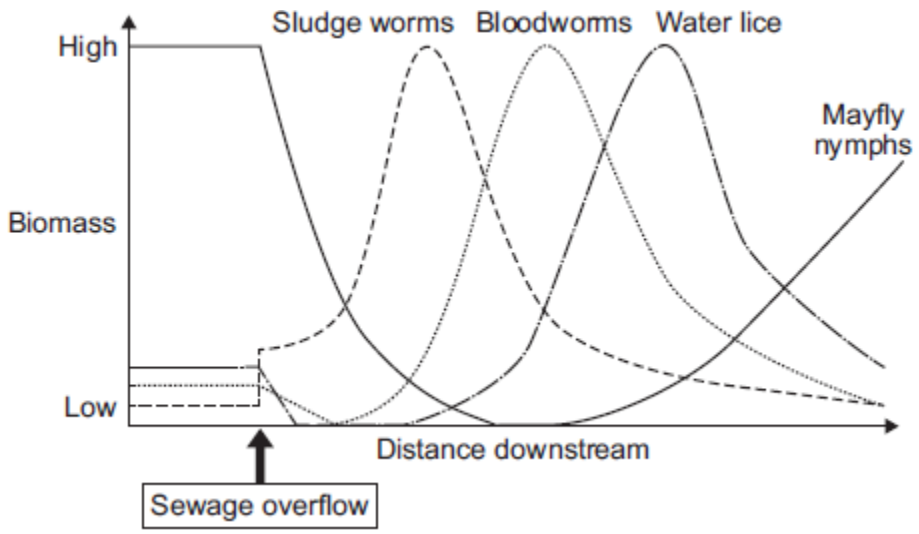


An accident caused sewage to overflow into **Stream Z**.
Two weeks later scientists took samples of water and invertebrates from the stream.
They took samples at different distances downstream from where the sewage overflowed.
The scientists plotted the results shown in **Graphs P** and **Q**.

Graph P: change in water quality downstream of sewage overflow



Graph Q: change in invertebrates found downstream of sewage overflow



(i) Describe the patterns shown in **Graph P**.

(4)

(ii) Describe the relationship between dissolved oxygen and the survival of mayfly nymphs in **Stream Z**. Suggest a reason for the pattern you have described.

(3)

(c) Many microorganisms are present in the sewage overflow.

Explain why microorganisms cause the level of oxygen in the water to decrease.

_____

_____

_____

_____

(2)

(Total 13 marks)

7 Food chains show the flow of energy through the organisms in a habitat.

(a) The diagram below shows a food chain.

grass ⟶ **sheep** ⟶ **human**

The biomass in each stage of the food chain changes as food passes along the food chain.

Draw a pyramid of biomass for this food chain.

Label the pyramid.

(2)

(b) The table below shows three food chains, **A, B** and **C**.

	Food chain
A	plants ⟶ sheep ⟶ human
B	plants ⟶ grasshoppers ⟶ frogs ⟶ trout ⟶ human
C	plants ⟶ human

(i) In which food chain, **A**, **B** or **C**, will the greatest proportion of biomass and energy of the plants be passed to humans? ☐

(1)

(ii) Give reasons why the food chain that you chose in part **(b)(i)** passes on the greatest proportion of biomass and energy to humans.

_____

_____

_____

_____

_____

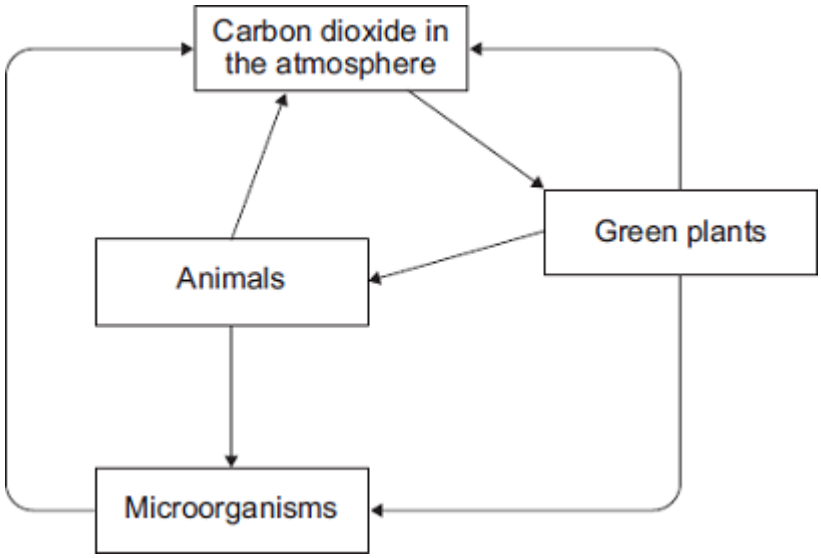
_____

(3)

(Total 6 marks)

8 *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

The diagram shows part of the carbon cycle.



Describe how living things are involved in the constant cycling of carbon.

(Total 6 marks)

9 Desert plants are adapted for survival in a dry climate.

(a) Joshua trees live in deserts.

By nyenyec [CC BY-SA 3.0], via Wikimedia Commons

Joshua trees have two different types of root:

- a system of shallow roots spread out over a large area
- roots about 1 m in diameter, shaped like bulbs, deep in the soil.

Explain the advantage to the Joshua tree of having:

(i) shallow roots spread out over a large area

_____

_____

_____

_____

(2)

(ii) large, bulb-like roots deep in the soil.

_____

_____

(1)

(b) Creosote bushes also live in deserts.

By Sue in az (Own work) [Public domain], via Wikimedia Commons

The leaves of creosote bushes:

- are covered with a layer of wax
- fold together during the day.

Explain how the leaves of the Creosote bush help it to survive in deserts.

_____

_____

_____

_____

_____

_____

(3)

(Total 6 marks)

10 Large areas of rain forest are being cleared and burnt in many parts of the world. The cleared land will often produce crops for only a few years.

(a) Explain why rain forests are being burnt to provide land for crops in many parts of the world.

(2)

(b) Explain why such cleared land will often produce crops for only a few years.

(2)

(c) Explain the effects that large-scale burning of forests may have on the Earth's atmosphere in the short and in the long term.

(4)

(Total 8 marks)

11 Human activities affect the environment.

(a) Deforestation results in an increase in carbon dioxide levels in the atmosphere.

Give **two** reasons why.

_____

_____

_____

_____

(2)

(b) *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

A dairy farmer washes out his cow shed each day. The waste water contains urine and faeces. The waste water overflows into a stream by mistake.

The waste water will have an effect on the plants and invertebrates living in the stream.

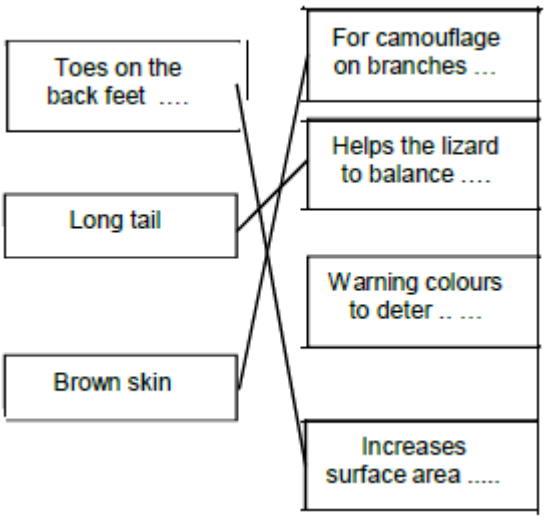
Explain why.

(6)

(Total 8 marks)

1

(a)



one mark for each line

*do **not** award mark for an adaptation if lines are drawn from it to more than one advantage*

3

(b) escape (predators)

accept faster than swimming

allow chase prey

allow it stops them from drowning

1

(c) food

1

territory

1

*deduct **one** mark for each tick in excess of two*

[6]

2

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

ignore oxygen / food / sun / carbon dioxide

- light
- water
- space
- nutrients / ions / minerals / named

*accept two named minerals / ions for **2** marks*

2

(ii) less competition for water

ignore space / light / food

or

more water / nutrients / minerals available

1

(b) camouflage / same shape as leaf / looks like a leaf

allow 'blends in'

ignore colour

1

[4]

3

(a) bottom / third pyramid ticked

extra box ticked cancels the mark

1

(b) the sun

extra ring drawn cancels the mark

1

(c) any **two** from:

- heat

  ignore keeping warm

- movement / named example internal or external

  ignore digestion

- respiration

  *do **not** allow <u>for</u> respiration*

- faeces / not all digested

  *allow waste for **1** mark if neither faeces nor excretion given (ie waste + movement = **2** marks waste + faeces = **1** mark*

- excretion/ urine

- not all of animal / all parts eaten

  *do **not** accept growth / reproduction*

2

[4]

4

(a) (i) (compost produced) quicker / faster / takes less time

it = tumbler bin

*answers should be comparative eg **only** 6 weeks = 1 mark*

6 weeks = 0 marks

1

(ii) any **two** from:

- takes less space
- cheaper (to buy)
- don't need to turn / rotate it

it = fixed bin

references to space and cost should be comparative

*do **not** accept unqualified data*

2

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

- faster rise (in tumbler)
- higher (in tumbler) **or** 2 correct number readings
- levels off (in tumbler) **or** continues to rise in fixed

it = tumbler bin

ignore eg faster compost

2

(ii) microorganisms / microbes / decomposers

allow bacteria / fungi / detritus feeders / worms / other named examples of detritus feeders / mould

1

aerobic

allow air(y)

allow oxygen(ated)

1

(iii) faster respiration / decay / **or** microorganisms / microbes / decomposers work faster (in tumbler)

allow converse

allow bacteria / fungi / mould

1

so more heat produced (in tumbler)

ignore heat produced by friction

OR

more air / more oxygen(ation) (in tumbler) (1)

so more respiration / faster decay / bacteria work faster (in tumbler) (1)

1

[9]

5 any **three** from:

ignore references to carbon cycle

accept digested / decomposed / broken down / rotted for decay throughout

ignore eating

- dead leaves / flowers / bluebells are decayed
- idea that microorganisms do the decaying

  accept microbes / bacteria / fungi / mould / decomposers for microorganisms
- minerals / ions / nutrients / named released (by decay / microorganisms)

  ***not** mineral ions unqualified*
- (released) into soil **or** minerals / ions / nutrients taken up / in by (bluebell) roots (next year)

  look for idea that minerals / ions / nutrients are in soil (eg released into soil or taken up from soil)

3

[3]

6 (a) (i) correct bar heights

*three correct **2** marks*

*two correct **1** mark*

*one or none correct **0** marks*

ignore width

2

(ii) (Stream Y)

has many sludge worms / bloodworms

or

has no mayflies / caddis or few shrimp

*allow **1** mark if invertebrate not named but correct association given*

1

which indicate medium or high pollution

1

(b) (i) suspended solids increase (as a result of sewage overflow)

1

then decrease downstream / return to original levels

1

oxygen levels decrease (after sewage overflow)

1

and then rise again

1

(ii) any **three** from:

- mayflies decrease (to zero) near overflow
  accept 'have died out'
- because oxygen is low **or** mayflies have high oxygen demand
- mayflies repopulate / increase as oxygen increases again
- can't be sure if dissolved oxygen or suspended solids is the cause

3

(c) they respire / respiration
*aerobic respiration gains **2** marks*

1

this requires / uses up the oxygen

1

[13]

7 (a) 3-layered triangular pyramid
as blocks or layered triangle, ignore (small) gaps between layers

1

(pyramid) labelled in food chain order
all three labels are required
*for **2** marks the pyramid must be fully correct*

1

(b) (i) C

1

(ii) shortest **or** fewest stages / transfers / (trophic) levels
allow only if (b)(i) is C or blank

1

less losses in waste / faeces / urine / CO_2 / excretion
allow smaller amount uneaten

1

less loss in respiration / heat / movement
allow less lost keeping warm
*do **not** allow energy for respiration*
*do **not** allow respiration makes energy*
*allow less loss (of biomass / energy) **or** less transfer (of biomass / energy) to surroundings if neither 2nd nor 3rd point given, for **1** mark*

1

[6]

8 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]

9 (a) (i) increased water uptake

ignore nutrients / food
allow quicker water uptake
allow collects water over larger area

1

(after) rain

accept ideas in terms of more successful competitor

1

(ii) water storage **or** stability **or** safety from predators

ignore absorption of water from soil

1

(b) reduces water loss / evaporation

accept reduces transpiration

allow stops water loss

1

wax protects plant **or** reflects heat **or** keeps plant cool **or** unpalatable

ignore reflects light

1

folding reduces surface area **or** folding reduces warming

*accept enclosed stomata **or** less exposure of stomata **or** increased humidity **or** less water concentration gradient*

allow prevents burning

ignore less likely to be damaged

1

[6]

10 (a) increased human population
increased standard of living

each for 1 mark

2

(b) nutrients absorbed by plants not replaced

each for 1 mark

2

(c) increased release of carbon dioxide into atmosphere when trees are burned
reduced rate of carbon dioxide removal from atmosphere
increased carbon dioxide absorbs more of energy radiated by Earth
global rise in temperature

each for 1 mark

4

[8]

11 (a) any **two** from:

- fewer trees to take in carbon dioxide for photosynthesis
- decomposers / microorganisms respire (as they decay debris) releasing carbon dioxide
- burning of wood releases carbon dioxide

allow carbon dioxide released by burning fossil fuels in vehicles / factories

2

(b) 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 on page 5, and apply a 'best − fit' approach to the marking.

0 marks
No relevant content.

Level 1 (1 − 2 marks)
There is a brief description of some steps in the process but the order is not clear with little biological vocabulary used.

Level 2 (3 − 4 marks)
There is a reasonably clear description of the process involving many of the steps and using some biological vocabulary.

Level 3 (5 − 6 marks)
There is a clear, logical and detailed scientific description of the process using appropriate biological vocabulary.

examples of biology points made in the response:

- this contains mineral ions (and organic matter)
- this increases growth of algae / water plants
- the plants / algae (underneath) die
- due to lack of light / photosynthesis / space
- decomposers / microorganisms feed on decaying matter **or** multiply rapidly
- the respiration of decomposers uses up all the oxygen
- so invertebrates die due to lack of oxygen
- this is called eutrophication

6

[8]