Q1. Organisms have adaptations that enable them to survive in extreme conditions.

(a) The photograph shows an arctic fox.

This fox lives in the arctic, where it is very cold.

Suggest **two** ways in which the arctic fox is adapted for life in very cold conditions.
Explain how each adaptation helps the arctic fox to survive in very cold conditions.

Adaptation 1 .....

.....

How this adaptation helps the arctic fox to survive in very cold conditions.

.....

.....

.....

Adaptation 2 .....

.....

How this adaptation helps the arctic fox to survive in very cold conditions.

.....

.....

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(4)

(b) The photograph shows an antelope that lives in a sandy desert.

The antelope is prey to large cats such as cheetah.

Suggest **two** adaptations that help this antelope to avoid being killed by predators.
Explain how each adaptation helps the antelope to avoid being killed by predators.

Adaptation 1 .....

.....

How this adaptation helps the antelope to avoid being killed by predators.

.....

.....

.....

Adaptation 2 .....

.....

How this adaptation helps the antelope to avoid being killed by predators.

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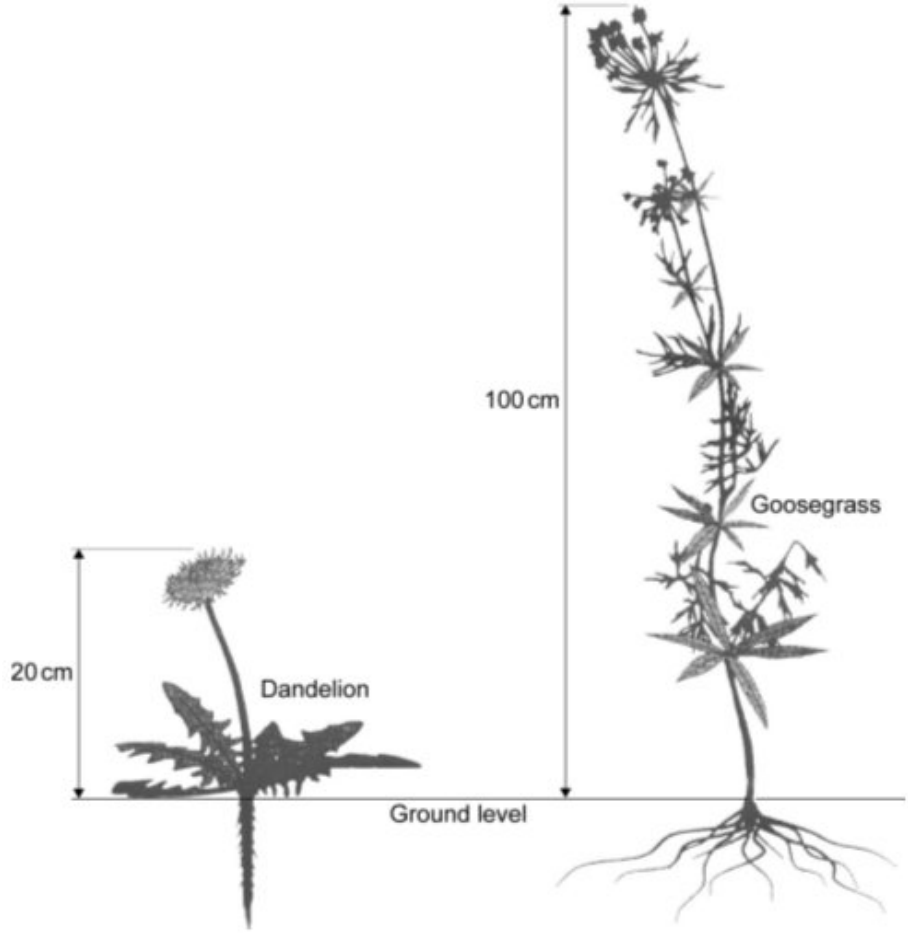
(4)
(Total 8 marks)

Q2. The drawings show a dandelion plant and goosegrass plant.

The drawings are not drawn to the same scale.



Dandelions have become adapted to live in lawns and in fields where animals feed.

Goosegrass has become adapted to live alongside hedges.

Use the information in the drawings to answer the questions.

Suggest the advantage to the plants of each of the following features:

(a) the dandelion leaves are flat on the ground

.....

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(1)

(b) the thick root of the dandelion

.....

.....

(1)

(c) the long stems of the goosegrass

.....

.....

(1)

(d) the widespread roots of the goosegrass.

.....

.....

(1)
(Total 4 marks)

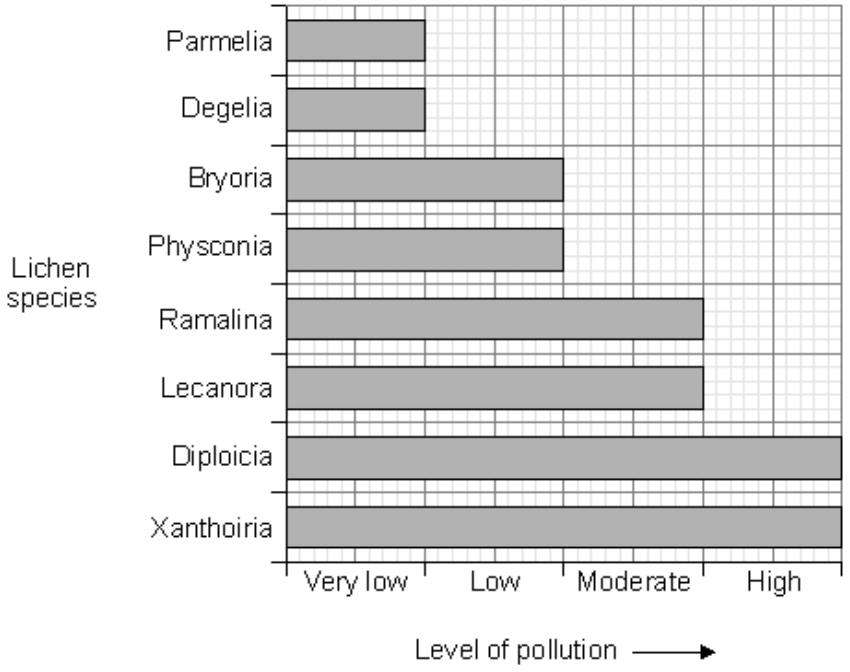
Q3. Lichens are pollution indicators.

(a) Complete the following sentence.

Lichens are indicators of the gas .....

(1)

The chart shows how much pollution different lichens can tolerate.



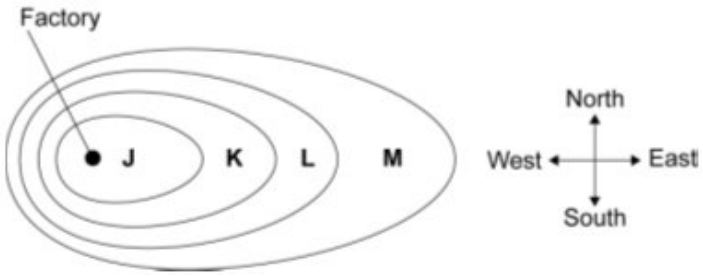
(b) Which lichen is most sensitive to pollution?

Tick (✓) **one** box.

Lichen	Tick (✓)
Degelia	
Diploicia	
Physconia	

(1)

(c) The diagram shows the areas, **J**, **K**, **L** and **M**, in which different lichen species grew around a factory. The factory burns coal.



(i) In which direction does the wind blow the pollution from the factory?

Tick (✓) **one** box.

Lichen	Tick (✓)
From the factory towards the north	
From the factory towards the east	
From the factory towards the south	
From the factory towards the west	

(1)

(ii) Which row in the table shows a correct distribution of lichens?

Tick (✓) **one** row.

Lichen in area J	Lichen in area K	Lichen in area L	Lichen in area M	Tick (✓)
Xanthoria	Diploicia	Parmelia	Ramalina	
Degelia	Bryoria	Lecanora	Xanthoria	
Xanthoria	Lecanora	Bryoria	Parmelia	

(1)

(Total 4 marks)

Q4. Swallows and swifts migrate between Britain and South Africa every year.

(a) **Photograph 1** shows a swallow.

Photograph 1

Swallows can fly very quickly.

Use information from the photograph to give **one** way in which the swallow is adapted for flying very quickly.

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.....

(1)

(b) **Photograph 2** shows swifts.

Photograph 2

Swallows and swifts both feed on flying insects.
They both spend the summer in Britain and then migrate to South Africa in the autumn.

Suggest **one** reason why swallows and swifts do not stay in Britain in the winter.

.....

.....

(1)

(c) The table gives data about swallows and swifts.

	Swallows	**Swifts**
Arrival date in Britain	April	Early May
Leaving date from Britain	October	Early August
Food	Flying insects	Flying insects
Height at which the birds feed	Near ground level	Up to 350m above ground level
Times at which birds feed	Mainly when it is light	Almost 24 hours per day

(i) There is very little competition between swallows and swifts for food.

Use information from the table to suggest **two** reasons for this.

1 .....

.....

2 .....

.....

(2)

(ii) Swallows and swifts do compete for some factors.

Suggest **one** of these factors.

.....

.....

(1)

(Total 5 marks)

Q5. 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.

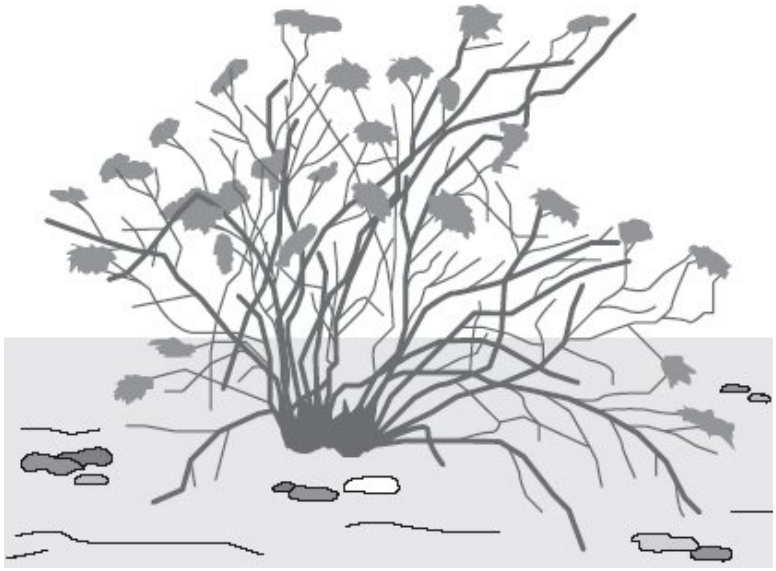
1 .....

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?

.....

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(1)

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

The katydid is preyed on by birds.

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

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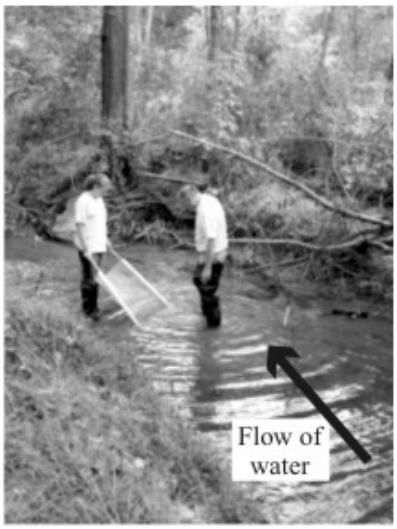
(1)

(Total 4 marks)

Q6. Invertebrate animals are used to monitor pollution in streams. The photograph shows scientists collecting a sample of invertebrates from a stream.



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This is the method that they use.

- A 1 m^2 area of the bed of the stream is marked out.
- A net 1m wide is held by one person on the downstream side of the marked-out area.
- The other person uses their boots to gently move stones in this area of the stream bed. They do this for three minutes. This dislodges invertebrates which are then caught in the net.
- The invertebrates are then identified and counted.

(a) Name **two** control variables (variables which must be kept the same) in this investigation.

1. .....

2. .....

(2)

(b) Suggest **two** reasons why the results from a sample might not be accurate.

1. .....

.....

2. .....

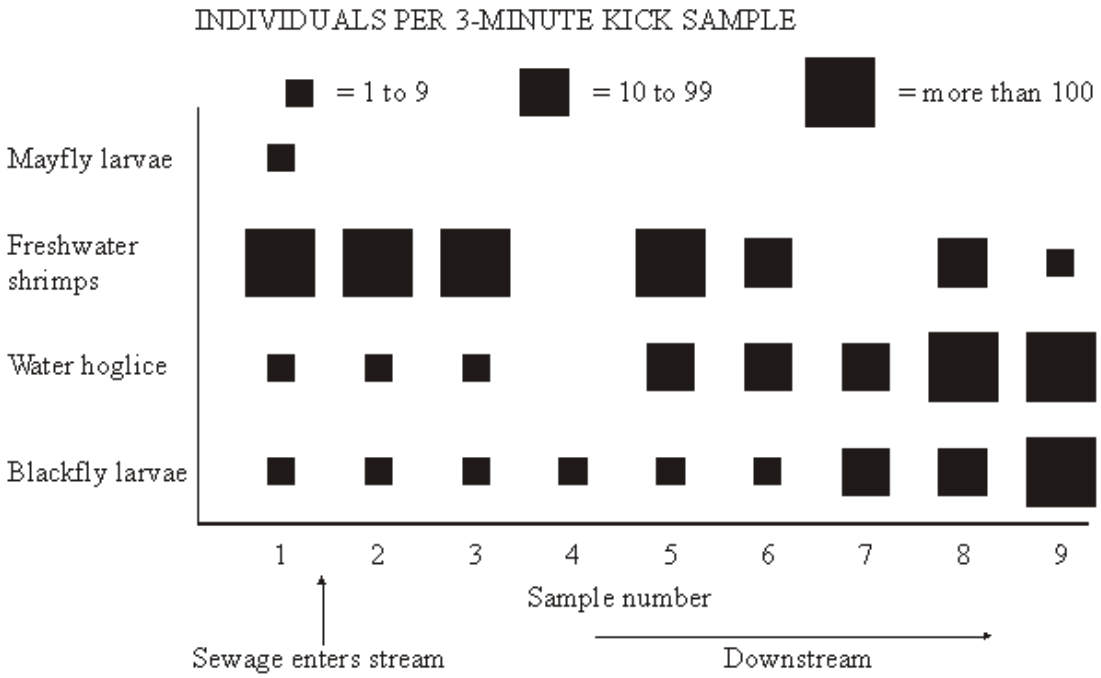
.....

(2)

The technique described above was used to investigate the effect of sewage on stream invertebrates.

- Sample 1 was taken upstream of the point where the sewage entered the stream.
- Samples 2–9 were taken at regular intervals downstream of the sewage inflow.

The graph shows the results.



(c) What was the range of the number of blackfly larvae that could be found in sample 7?

.....

(1)

(d) Describe, as fully as you can, how the number of water hoglice changed downstream from where sewage entered the stream.

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.....

.....

(2)

(e) Which of the four invertebrates is the best indicator species for water which is **not** polluted by sewage?

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Give the reason for your answer.

.....

.....

(2)
(Total 9 marks)