-

Questions unit 21 – sewage, pollution, conservation

1 Which shows from where most plants and most animals obtain carbon?

	most plants obtain carbon from	most animals obtain carbon from
A	the air	plants
B	the soil	the air
C	the air	the soil
D	the soil	plants

2 What may cause the rapid growth of plants in a lake?
A excess fertilisers
B excess herbicides
C low water pH
D low water temperature

**3** The table shows some information about two closely related species of sea bird.

bird species X	bird species Y
mixed diet, but no small fish	eats mostly small fish
catches fish out at sea	catches fish near river mouths
nests high on cliffs or broad ledges	nests low on cliffs or on shallow ledges

Sewage pollution at the mouth of a river destroys its fish stocks.
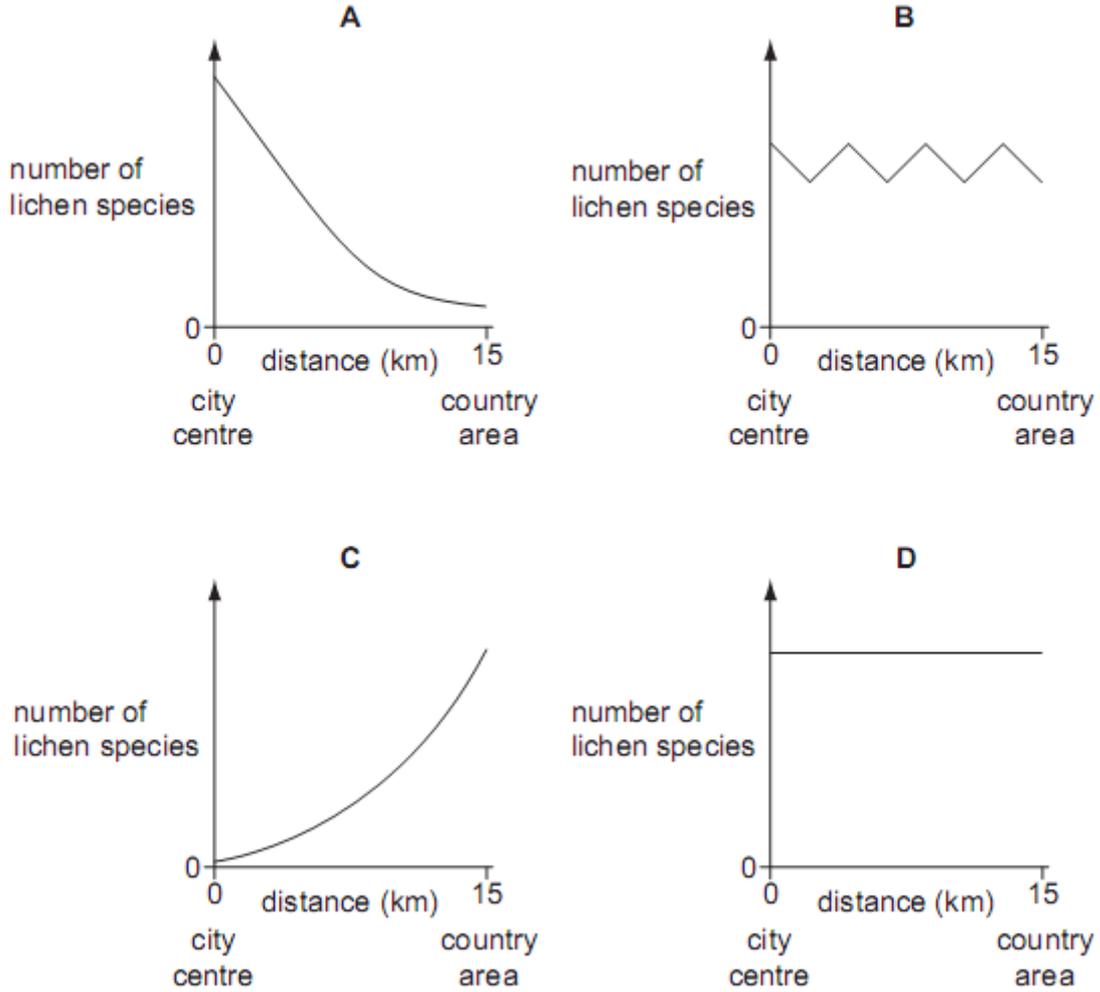What is likely to happen to local populations of these birds?
A There will be no change to either species.
B Species X numbers will decrease, species Y will remain constant.
C Species Y numbers will decrease, species X will remain constant.
D Both species numbers will increase.

4 The populations of four organisms in a lake were measured between 1908 and 1990. Which organism was affected by an outbreak of disease in 1984?
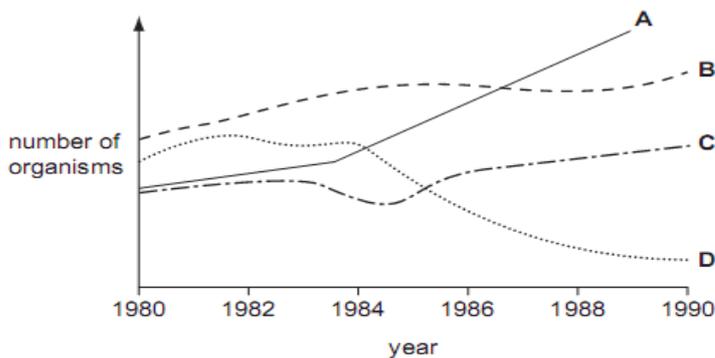
5 Lichens are organisms that do not grow well in air containing sulphur dioxide. Which graph shows the change in number of lichen species from the centre of an industrial city to a country area 15km away?

A

number of
lichen species

0
0   distance (km)   15
city   country
centre   area

B

number of
lichen species

0
0   distance (km)   15
city   country
centre   area

C

number of
lichen species

0
0   distance (km)   15
city   country
centre   area

D

number of
lichen species

0
0   distance (km)   15
city   country
centre   area

6 Some bacteria were grown in a nutrient solution over a period of two weeks. The graph shows how the population of bacteria changed during this time.

Which is the lag phase in the growth of this population?

population
size

C
B
D
A

0   1   2
time/weeks

-
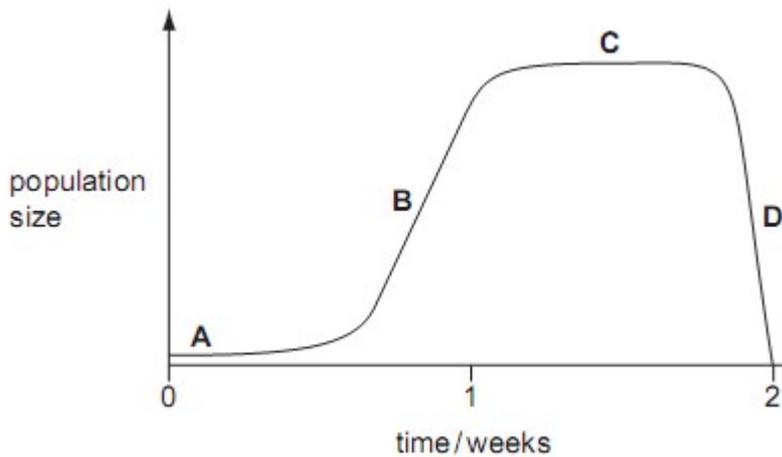
7 The graph shows the change in the numbers of a species of small mammal living on an island.
Which letter represents the phase where the population growth is slowing down?
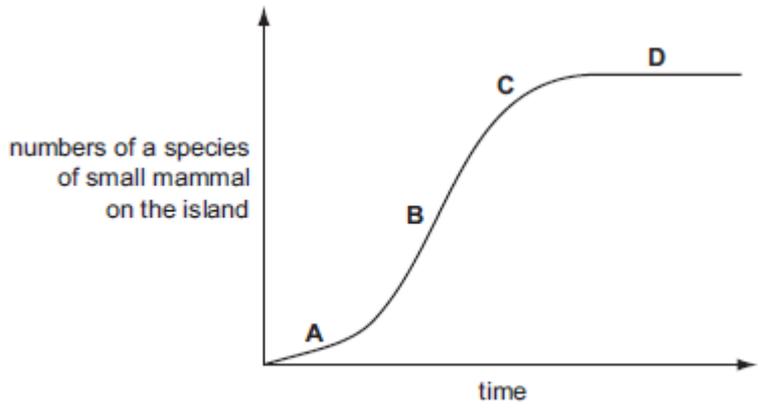

8 What could be a consequence of deforestation?
A More habitats are produced for animals and plants.
B More transpiration may increase rainfall.
C Rainwater runs off the land causing flooding.
D Soil erosion is less likely.

9 The diagram shows the positions of four farms and the concentrations of nitrate at different pointsin a river.
Which farm is likely to have been using too much fertilizer on its land?
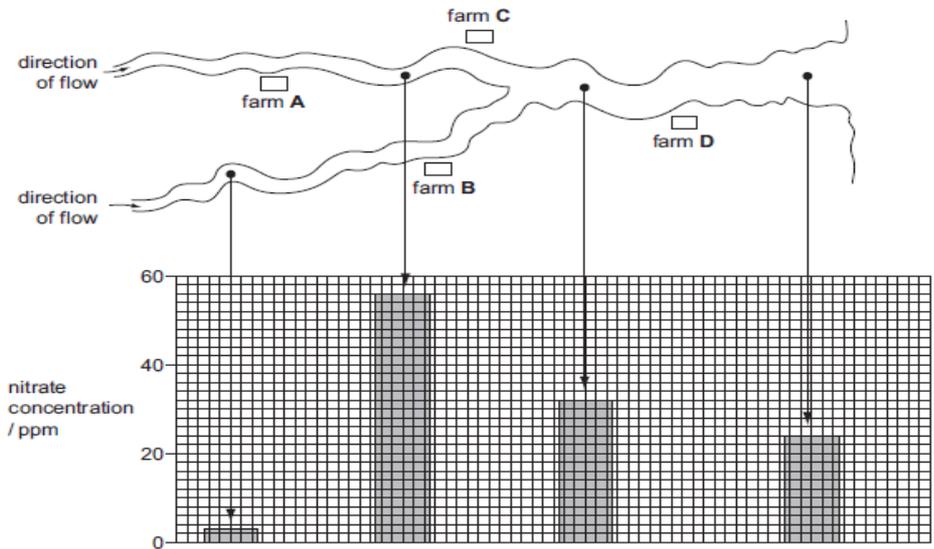
10 The graph shows the relationship between sulphur dioxide pollution and the number of lichen species found on trees.

number of lichen species

sulfur dioxide level/ $\mu g\ m^{-3}$
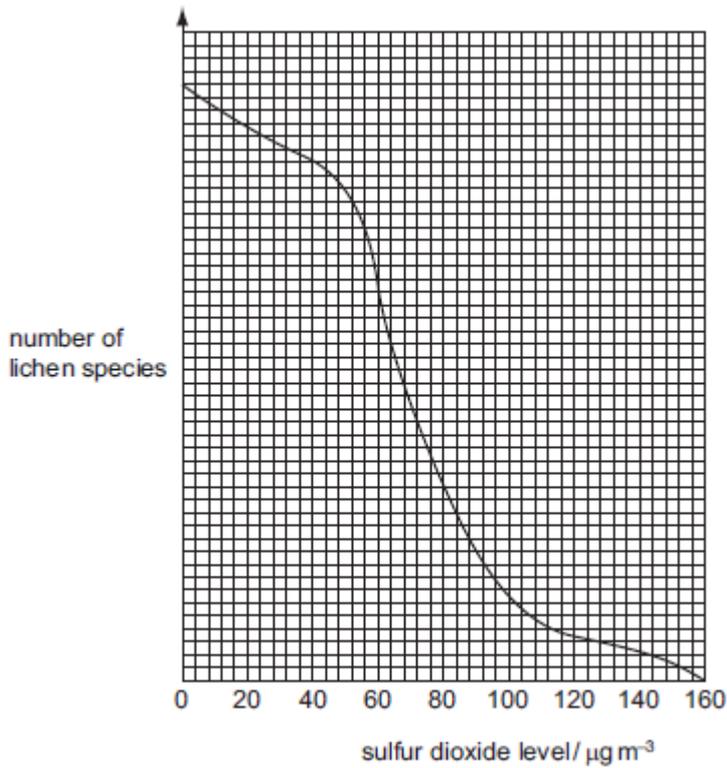
From the graph, which statement is correct?
A As sulfur dioxide levels increase the number of lichen species decreases.
B Lichens cannot survive if any sulfur dioxide is present.
C Lichens are not affected by sulfur dioxide pollution.
D As sulfur dioxide levels increase so do numbers of lichen species.

11 The graph shows the rate of growth for a population of herbivores.
Which is the exponential (log) phase in the growth of this population?

number of herbivores

time

-
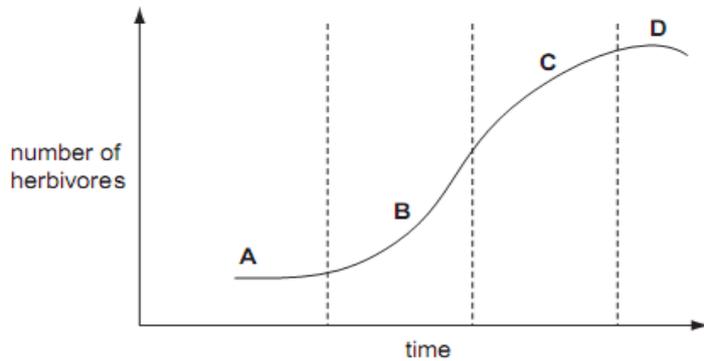
12 Different pesticides were tested to see how poisonous they were to fish. Scientists found the concentration of pesticide that killed 50% of the fish within four days.
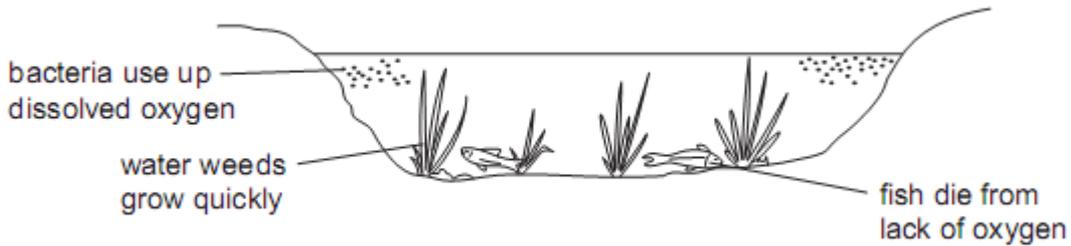The table shows the results of the tests.

pesticide	concentration that killed 50% of the fish/p.p.m.
DDT	0.03
dieldrin	0.01
malathion	12.20
parathion	2.11

Which pesticide was the most dangerous to the fish?

A DDT

B dieldrin

C malathion

D parathion

13 The diagram shows some of the effects of human activity on a river.

What could have caused these effects?

A air pollution

B deforestation

C over-use of fertilisers

D presence of weed killers

14 A large area is heavily overgrazed for many years.
What is the effect on soil nutrients and soil erosion?

	soil nutrients	soil erosion
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

15 Fig. 8.1 shows changes in the population of bacteria that take place in a river when untreated sewage is added to it.
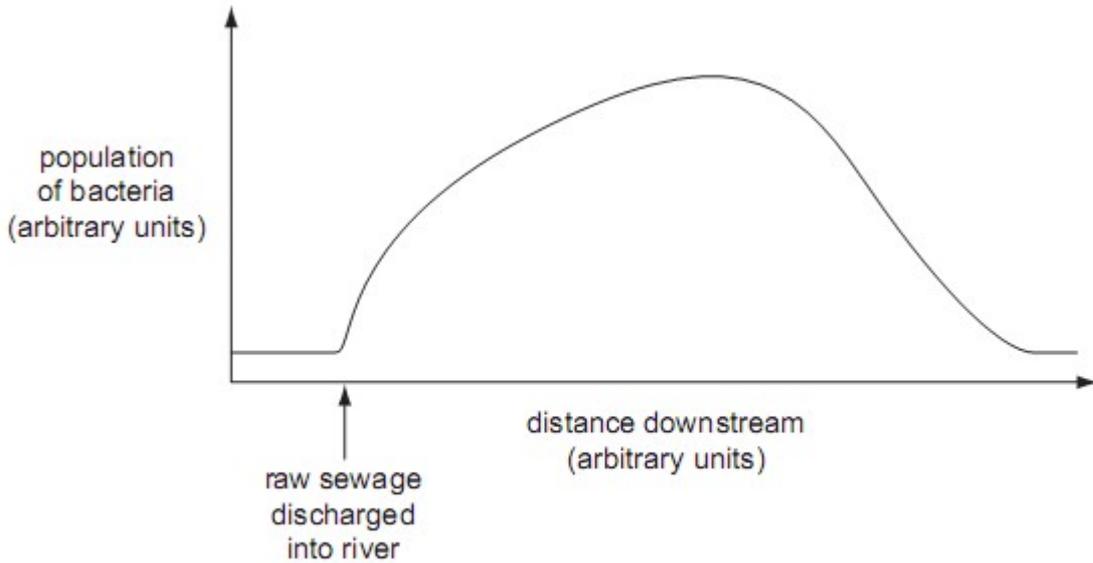

population
of bacteria
(arbitrary units)

distance downstream
(arbitrary units)

raw sewage
discharged
into river

Fig. 8.1

(a) Describe the changes in the population of bacteria that take place in this river.

....
.... [2]

  (b) Suggest an explanation for these changes in the population of bacteria.

....
.... [4]
[Total: 6]

16 After an accident at a nuclear power plant in 1986, particles containing radioactive strontium were carried like dust in the atmosphere. These landed on grassland in many European countries.
 When sheep fed on the grass they absorbed the strontium and used it in a similar way to calcium.
  (a) Explain where in the sheep you might expect the radioactive strontium to become concentrated.

....
.... [2]

  (b) Suggest the possible effects of the radiation, given off by the strontium, on cells in the body of the sheep.

....
.... [3]
[Total: 5]

17 Rabbits are primary consumers. Fig. 5.1 shows changes in the population of rabbits after a small number were released on an island where none had previously lived.
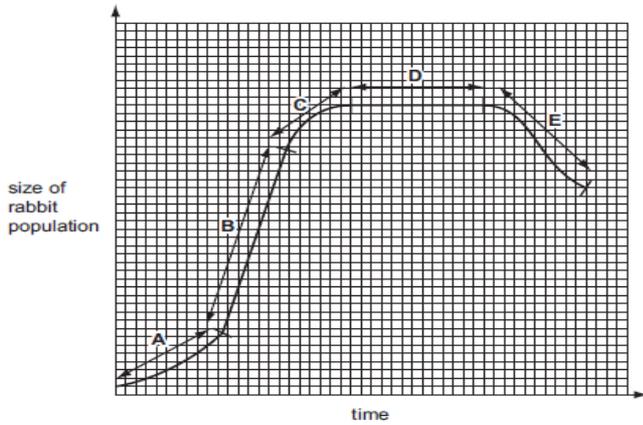

Fig. 5.1

(a) Which stage, A, B, C, D or E, shows when the birth rate was
(i) equal to the death rate,[1]
(ii) slightly greater than the death rate?[1]
(b) (i) Suggest two factors that allowed the change in the rabbit population during stage B. [2]
(ii) Suggest two reasons for the change in the rabbit population during stage E. [2]
[Total: 6]

18 A remote-controlled submarine gathered a sample of mud from the bottom of the sea.
Fig. 1.1 shows an apparatus that was set up to investigate if the mud contained any living organisms.
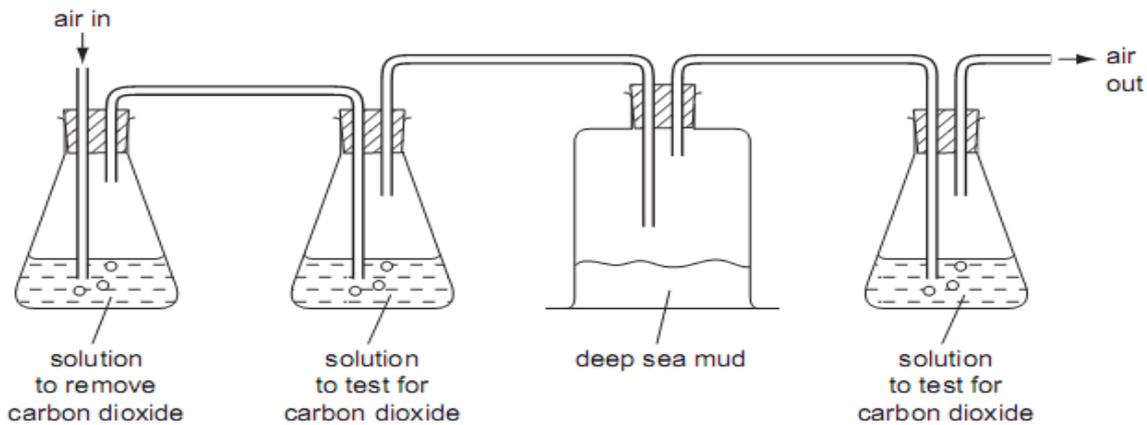

Fig. 1.1

(a) (i) Name a solution that could be used to test for carbon dioxide. [1]
(ii) Carbon dioxide was detected coming from the mud.
Suggest the two characteristics of living organisms that could be linked to this observation.
1.
2. [2]
(b) List three other characteristics of living organisms.
1.
2.
3. [3] [Total: 6]

19 The wild dog is one of the smaller African carnivorous mammals. It has disappeared from 25 of the 39 countries where it used to live. Wild dogs hunt in packs, feeding on antelopes, which are grass-eating mammals.

A conservation programme has been started to increase the wild dog population in South Africa. Farmers are worried about numbers getting out of control because wild dogs breed at a very fast rate. However, conservationists are not concerned because the lion is a natural predator of the dogs.

(a) Wild dogs are carnivorous mammals.

(i) Define the term carnivore.

…… …….. [1]

(ii) State one external feature which distinguishes mammals from other vertebrates.

…… …….. [1]

(b) (i) Suggest two reasons why numbers of African wild dogs are decreasing.

1.

…… ……..

2.

…… .. [2]

(ii) Suggest what could happen to the species if numbers continue to decrease.

……… …….. [1]

(c) Using the information in the passage above, construct a food chain for a wild dog, including its predator. Label each organism with its trophic level.

……… …….. [4]

(d) It is important that the wild dog species is conserved.

(i) Explain the meaning of the term conservation.

……… …….. [2]

(ii) Outline the measures that could be taken to conserve a mammal, such as the wild dog.

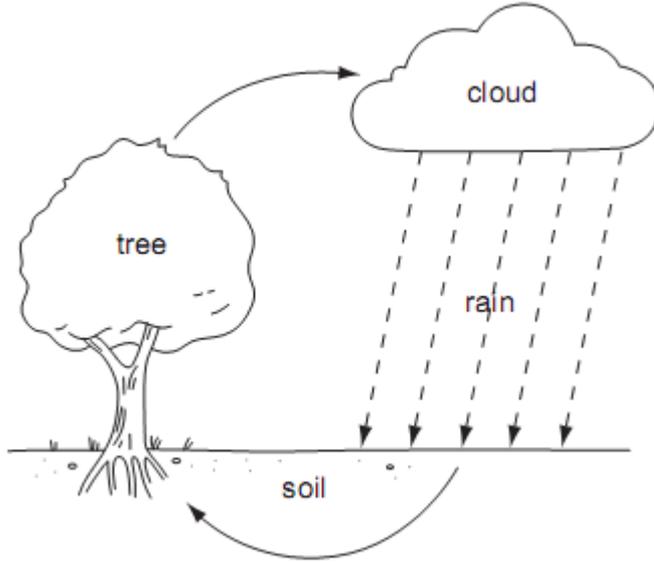……… …….. [3]

(e) When wild dogs die, nitrogen compounds in their bodies may become available for plants. Outline the processes that occur to make these nitrogen compounds in the bodies of dead animals available for plants to absorb.

……… …….. [5]

[Total: 19]

-

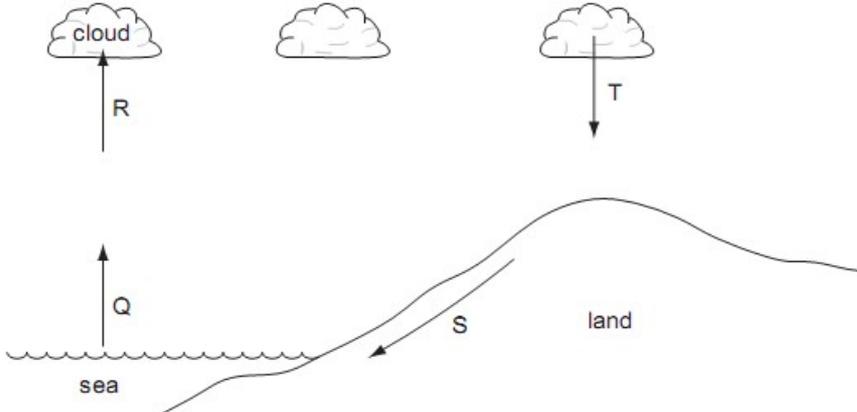**20** The diagram shows a simple water cycle.

What is responsible for water loss from the tree?
A decomposition
B photosynthesis
C translocation
D transpiration

21 The diagram shows the water cycle. The arrows show four processes that take place during this cycle.

Which combination identifies these processes?

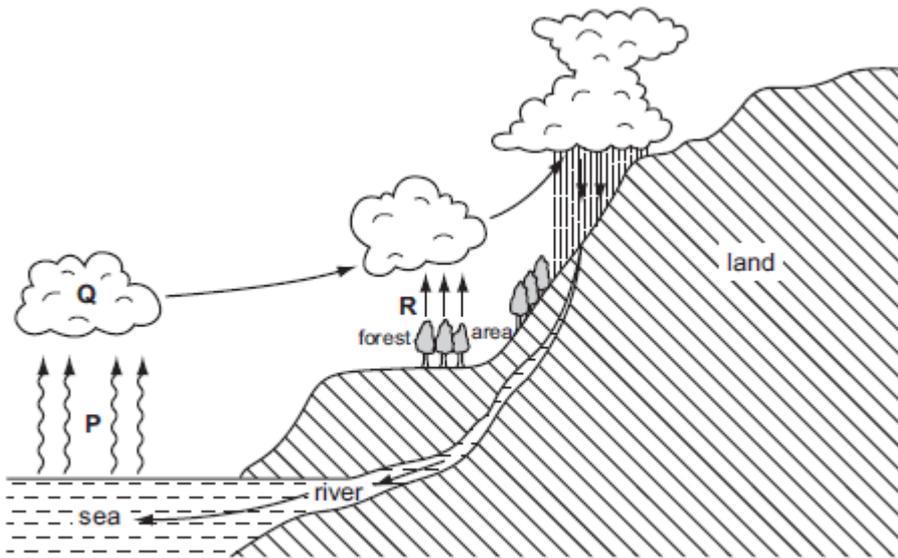|	condensation	evaporation	precipitation
A	Q	R	T
B	R	Q	T
C	R	S	T
D	S	Q	R

22 Fig. 4.1 shows the water cycle.

Fig. 4.1

(a) (i) The arrows labelled P represent evaporation. Which type of energy is needed for this process?[1]

(ii) State what causes the formation of clouds at Q.[1]

(b) (i) What process is represented by the arrows labelled R?[1]

(ii) Name three factors that could alter the rate at which process R happens.[3]

(c) A logging company wants to cut down the forest area.

(i) Suggest what effects this deforestation might have on the climate further inland.

Explain your answer.[2]

(ii) State two other effects deforestation could have on the environment. [2]

[Total: 10]

23 Fig. 2.1 shows *Salvinia molesta*, which is an Australian freshwater plant, introduced to the wetlands of Namibia as a source of animal food. However, in Namibia the plant reproduces much more quickly than in Australia. It quickly covers the surface of the water.
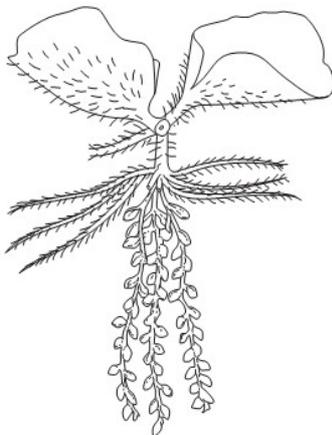

Fig. 2.1

-

(a) Scientists are concerned about the environmental damage caused by *S. molesta* to the aquatic habitats in the ecosystem of the Namibian wetlands.

(i) Define the term ecosystem.

………

…….. [2]

(ii) Outline how S. molesta could damage the aquatic habitats of the wetland ecosystem.

………

…….. [4]

(b) *S. molesta* is being controlled using an Australian beetle, *Cyrtobagous saliniae*. The beetle eats the growing points of the plant.

 Suggest and explain why

(i) it is better to use a natural consumer of the plant than to apply herbicides in the water to kill it,

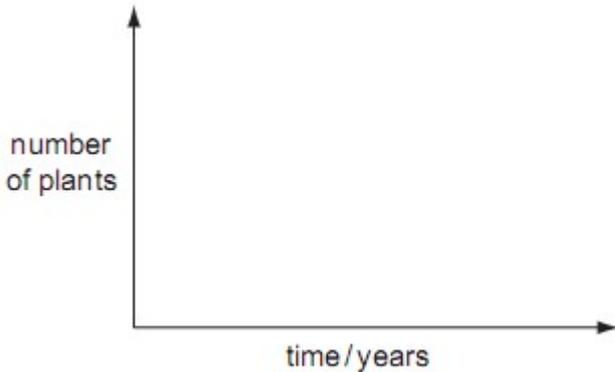………

…….. [2]

(ii) it could be dangerous to the wetland ecosystem to introduce Australian beetles.

………

…….. [2]

(c) The growth of *S. molesta* is now under control. Its population growth has followed the pattern of a sigmoid curve.

(i) Using the axes below, sketch a sigmoid growth curve for *S. molesta*. [1]

(ii) Label the phases of the sigmoid growth curve. [3]

number
of plants

time / years

(iii) Using the information given in this question (pages 3 and 4), state one factor that is limiting the growth of *S. molesta.*

………

……….. [1]

(iv) Explain how two other named factors could also limit the growth of *S. molesta*.

1.

……

2. …… [4]

[Total: 19]

23 Explain why acid rain has become an important environmental problem in some parts   of the world over the past 100 years.   [2]

24 The carbon dioxide concentration in the atmosphere has increased significantly over the past 150 years. Explain why this has happened.[2]