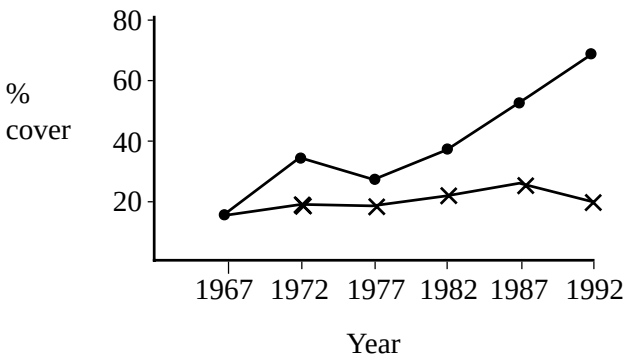
MANAGEMENT OF HUMAN INFLUENCES ON ENVIRONMENT

QUESTIONSHEET 1

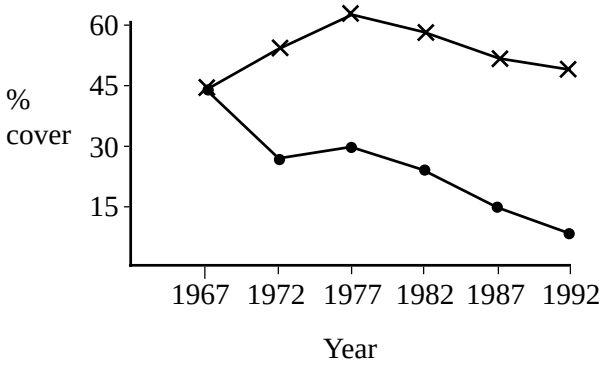
Do not write in margin

The graphs show the results of an investigation into the effect of grazing on two species of grass in an upland pasture in Wales. Prior to 1967, the pastures had been open to sheep. In that year a 105 hectare area was securely fenced and sheep were excluded. Sheep continued to graze outside the fenced area. The graphs show the percentage cover of two grass species in the grazed and ungrazed areas.

Agrostis vinealis



Nardus stricta



Key grazed by sheep

ungrazed

(a) Describe the effect which the removal of grazing pressure had on the percentage cover of the two grass species.

.....

.....

.....

[4]

(b) Which of the two species is the most palatable to sheep? Explain your answer.

.....

.....

.....

[2]

(c) Suggest an explanation for the effect of fencing on the percentage cover of N. stricta.

.....

.....

.....

.....

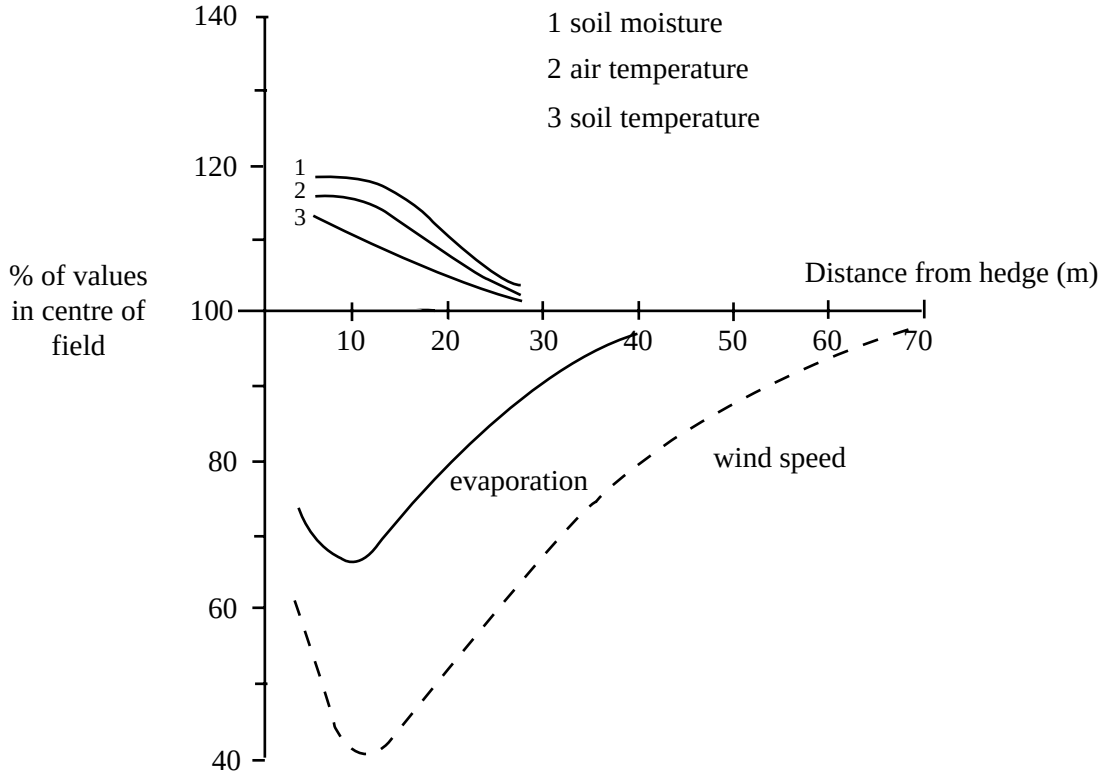
[4]

TOTAL / 10 _____

Do not write in margin

QUESTIONSHEET 2

The diagram shows the effect of a hedgerow on the environmental conditions in a wheat field.



(a) Suggest reasons why the hedgerow may increase the growth rate of the wheat.

.....

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.....

.....

[4]

(b) Explain the biological principles behind each of the following:

(i) planting leguminous crops in between rows of non-leguminous crops.

.....

.....

.....

[3]

(ii) ploughing and draining waterlogged soils.

.....

.....

.....

[3]

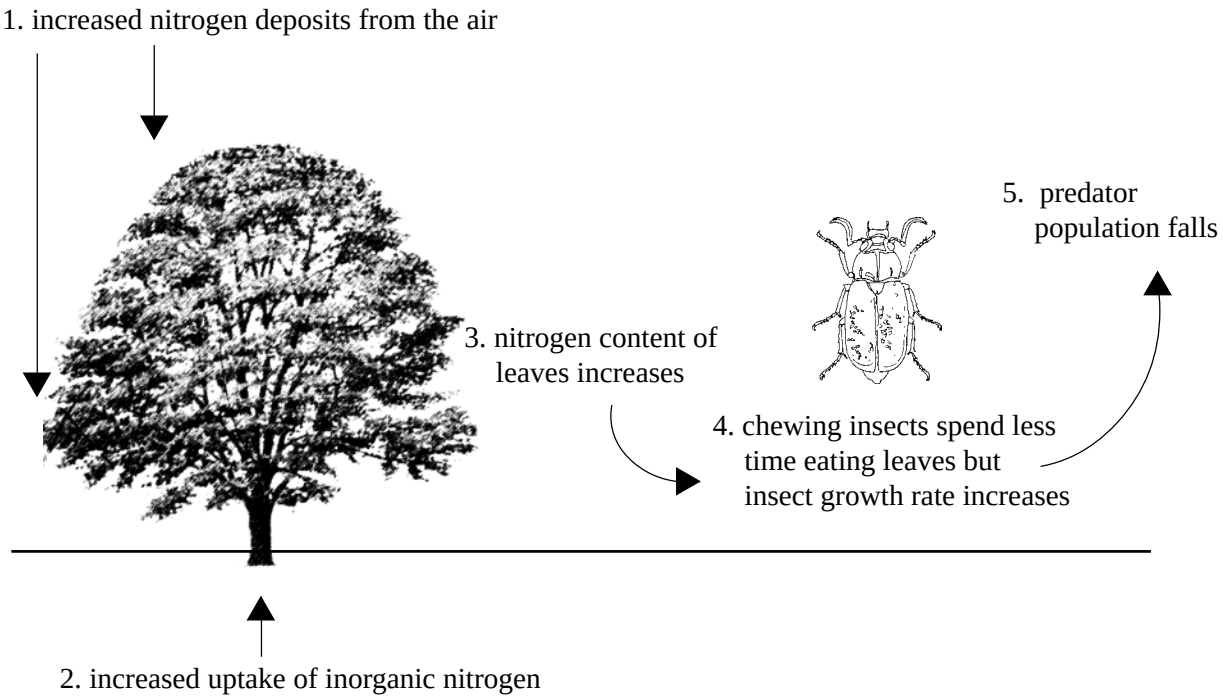
TOTAL / 10

MANAGEMENT OF HUMAN INFLUENCES ON ENVIRONMENT

QUESTIONSHEET 3

Do not write in margin

Scientists have been studying the possible effects of air pollution on herbivorous insects. The diagram shows a possible link between nitrogen deposition and die-back of trees on motorway verges.



(a) State the likely source of the nitrogen deposited on the trees.

.....

[1]

(b) In what form would the plant take in nitrogen?

.....

[1]

(c) Name two compounds found in plant leaves which would contain nitrogen.

1: .....

2: .....

[2]

(d) Suggest one reason why herbivorous insects spend less time on the leaves of such trees.

.....

[1]

(e) Suggest one reason why the population of predators may fall.

.....

.....

[2]

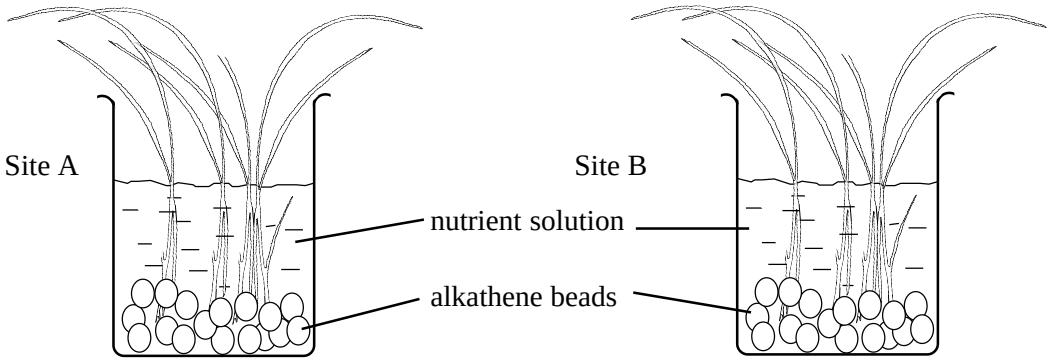
TOTAL / 7

MANAGEMENT OF HUMAN INFLUENCES ON ENVIRONMENT

Do not write in margin

QUESTIONSHEET 4

A student investigated the metal tolerance of two varieties of bent grass (Agrostis stolonifera); one from a site which was believed to be pollution free and one from a site known to be polluted by heavy metals. The student placed seedlings in beakers of nutrient solution and at intervals of 5 days measured the length of the longest root of each shoot in each of the beakers. After recording the mean length of the roots on day ten the student added a copper solution to each of the beakers. The diagram shows the apparatus used and the table shows the recordings.



Day	mean length of longest roots (mm)	
	Site A	Site B
5	13	11
10	15	14
15	19	14
20	22	15
25	25	16

(a) Calculate the mean percentage increase in root length in each beaker between days 10-25. Show your working.

Answers: Site A:..... Site B: ..... [4]

(b) Suggest which sample had been collected from the site contaminated by heavy metals. Explain your answer.

.....

.....

.....

[3]

(c) Suggest how the presence of heavy metals may have affected root growth in the soil from site B.

.....

.....

.....

[2]

(d) Suggest two precautions which the student should have taken in setting up this experiment.

1: .....

2: .....

[2]

TOTAL / 11

MANAGEMENT OF HUMAN INFLUENCES ON ENVIRONMENT

QUESTIONSHEET 5

Do not write in margin

Triazophos is an insecticide which is widely used to control yellow cereal fly on wheat. An investigation was carried out into the effects of spray drift on invertebrates living in hedgerows adjacent to a treated wheat field. The numbers of insects, arachnids (spiders) and other arthropods were measured before spraying and then 5 hours and 10 days following spraying. The results are summarised in the table and diagram below.

	organisms (percentage of pre-spray total)	
	period following spraying	
	5 hours	10 days
total insects	31	38
arachnids(spiders)	49	88
other arthropods	40	90

(a) Describe the data shown in the table.

.....

.....

.....

[3]

(b) Suggest an explanation for the following observations:

(i) The most seriously affected organisms (slowest to recover) were small species (<2mm).

.....

.....

[2]

(ii) arachnids appear to be less susceptible to the spray than insects.

.....

.....

.....

[2]

TOTAL / 7

QUESTIONSHEET 6

Do not write in margin

Suggest explanations for each of the following:

(a) Crop growth on deforested soils in the tropics may fail after only two years of harvests.

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.....

[3]

(b) Applications of nitrogen fertiliser to poorly drained soils may have very little effect on subsequent crop growth.

.....

.....

.....

.....

[3]

(c) The biomass of tertiary consumers is normally much less than the biomass of producers in an ecosystem.

.....

.....

.....

.....

.....

.....

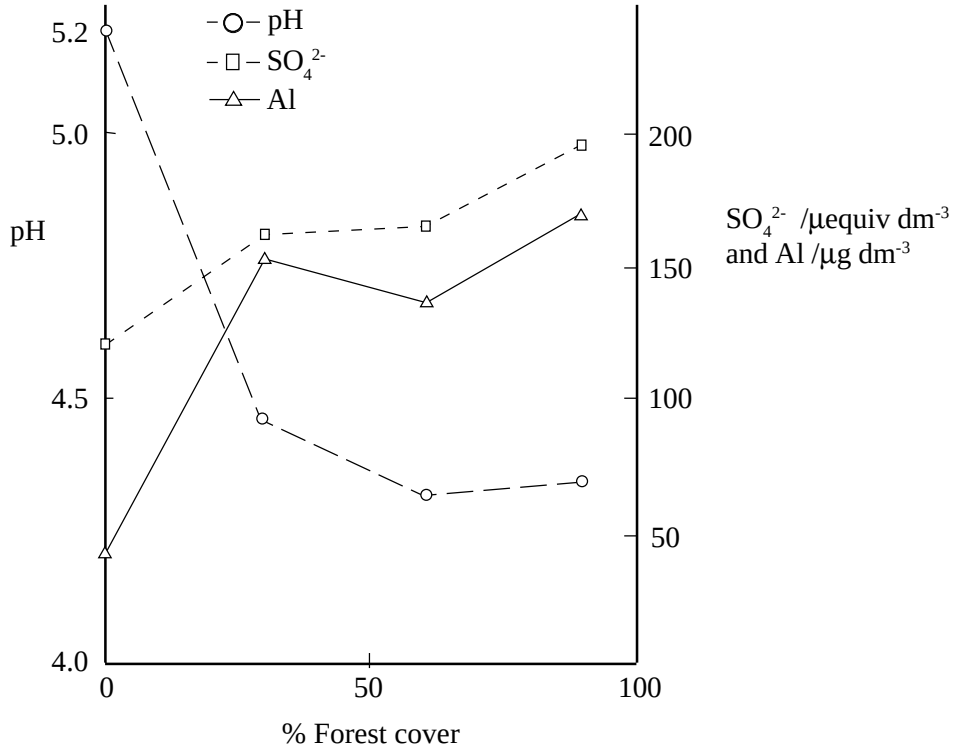
[5]

TOTAL / 11

Do not write in margin

QUESTIONSHEET 7

The graph shows the relationship between percentage forest cover and stream characteristics in a Scottish upland. The pH, sulphate concentration and aluminium concentration were calculated as a three-year average. The dominant tree species were spruce, fir and pine.



(a) Describe the relationship between forest cover and stream pH.

.....

..... [2]

(b) Suggest an explanation for the relationship shown between forest cover and stream sulphate concentration.

.....

.....

..... [3]

(c) Suggest an explanation for the trend in aluminium concentrations.

.....

..... [2]

(d) Outline the biological effects of acidification on stream biodiversity.

.....

.....

.....

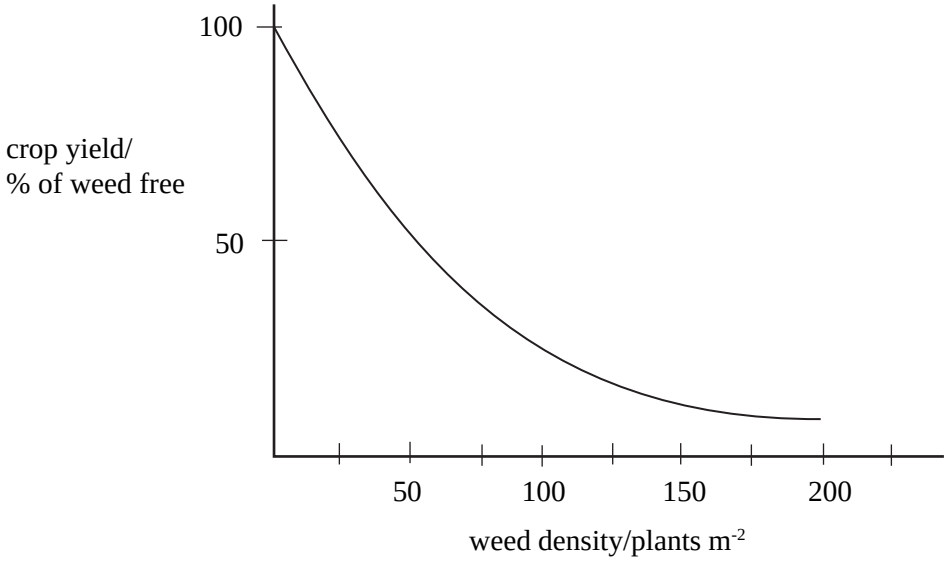
..... [4]

TOTAL / 11

QUESTIONSHEET 8

Do not write in margin

The graph below shows the results of an investigation into the effects of weed density on crop yield.



(a) Describe and explain the trend shown in the graph.

.....

.....

.....

[3]

(b) State two advantages and two disadvantages of biological pest control methods as compared to chemical control methods.

Advantage 1: .....

Advantage 2: .....

Disadvantage 1: .....

Disadvantage 2: .....

[4]

(c) Suggest two features of weeds which enables them to be successful.

1 .....

2 .....

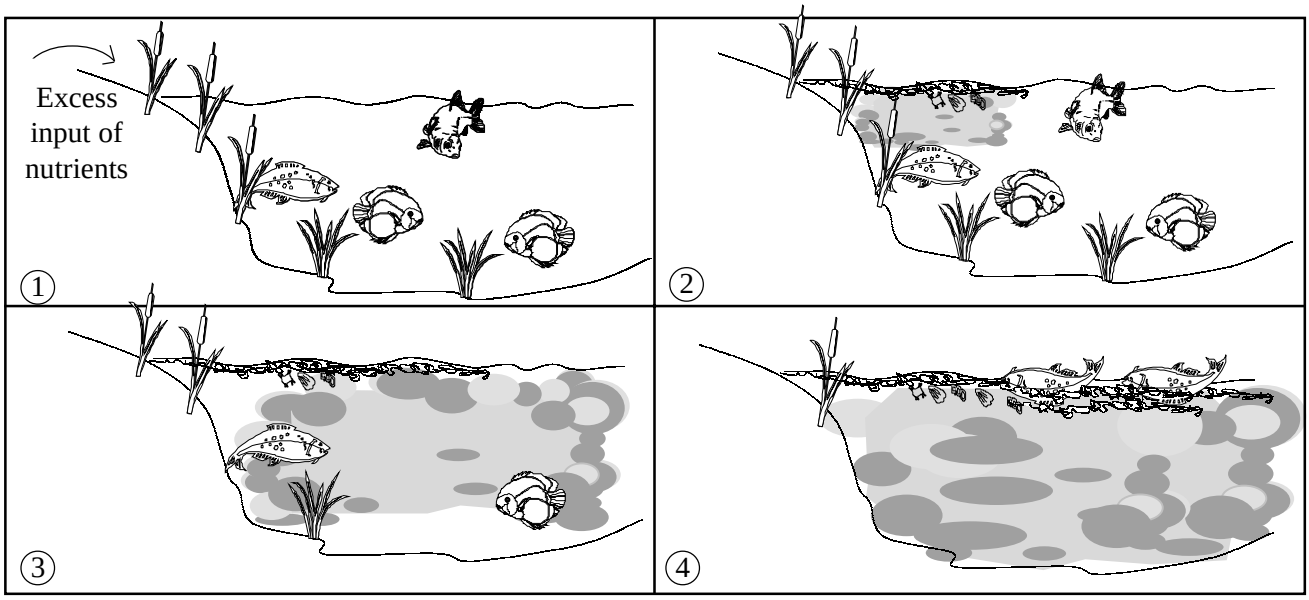
[2]

TOTAL / 9

Do not write in margin

QUESTIONSHEET 9

The drawings below show some of the effects of eutrophication of a freshwater lake



(a) Explain what is meant by eutrophication.

.....

.....

[2]

(b) Explain why, as a consequence of eutrophication:

(i) macrophytes (large plants) on the bed of the lake may die.

.....

.....

[2]

(ii) oxygen concentration decreases.

.....

.....

.....

[2]

(c) Explain why eutrophication may make water supplies:

(i) more expensive.

..... [1]

(ii) harmful to humans.

.....

..... [2]

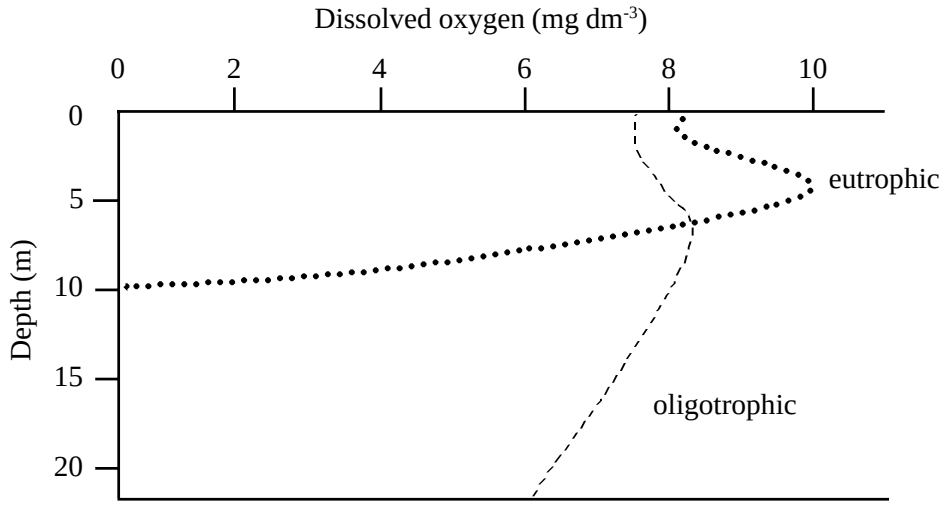
TOTAL / 9

MANAGEMENT OF HUMAN INFLUENCES ON ENVIRONMENT

QUESTIONSHEET 10

Do not write in margin

The graph below shows typical dissolved oxygen levels in nutrient poor (oligotrophic) and nutrient rich (eutrophic) lakes.



(a) Suggest explanations for the level of dissolved oxygen in the eutrophic lake between:

(i) 0-5 m. .....

.....

..... [3]

(ii) 5-10m. .....

.....

..... [3]

(b) Name two nutrients capable of causing such eutrophic conditions:

1. .....

2. .....

[2]

(c) Explain what is meant by the term 'biochemical oxygen demand' and describe how you would measure it.

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.....

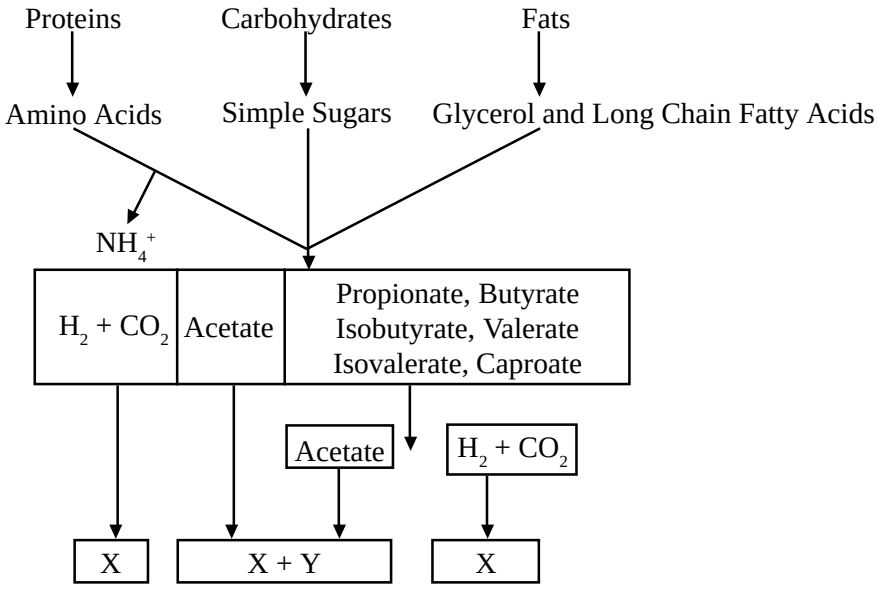
[4]

TOTAL / 12

QUESTIONSHEET 11

Do not write in margin

The diagram shows some of the stages in the decomposition of domestic waste in a landfill site.



(a) Identify gases X and Y

A. .....

B. .....

[2]

(b) (i) Suggest why these gases may be collected at landfill sites.

.....

[1]

(ii) Suggest one possible environmental problem associated with this process.

.....

[1]

(c) Outline the role of bacteria in the decomposition of domestic waste.

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.....

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.....

[3]

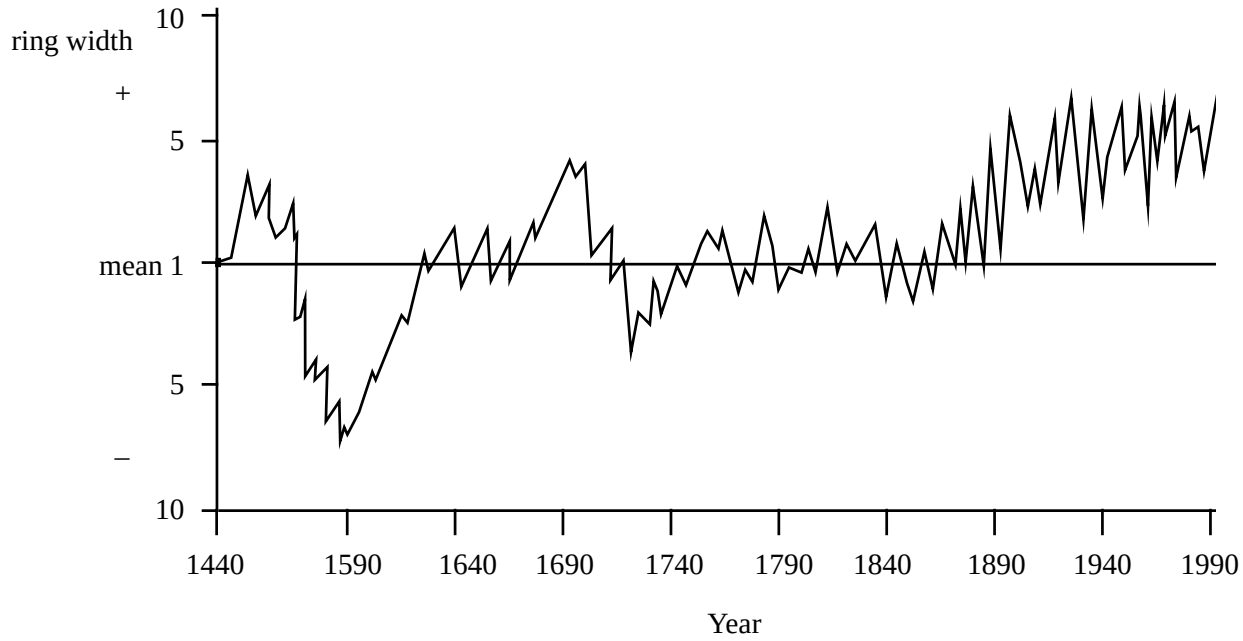
TOTAL / 7

MANAGEMENT OF HUMAN INFLUENCES ON ENVIRONMENT

QUESTIONSHEET 12

Do not write in margin

The past growth rate of trees can be deduced from measurements of tree ring widths. The greater the size of the annual ring, the greater the growth rate of the tree that year. The graph below shows the fluctuation in the width of tree rings in a 300 - 500 year old pine tree forest in Mongolia. The average ring width between 1540 and 1990 is given the value 1.



(a) State three abiotic factors which could influence the growth rate of the forest.

1. .....

2. .....

3. .....

[3]

(b) Suggest why growth rates appear to have increased since 1870.

.....

.....

.....

[2]

(c) Describe the effects of deforestation on the underlying soil and its population of organisms.

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.....

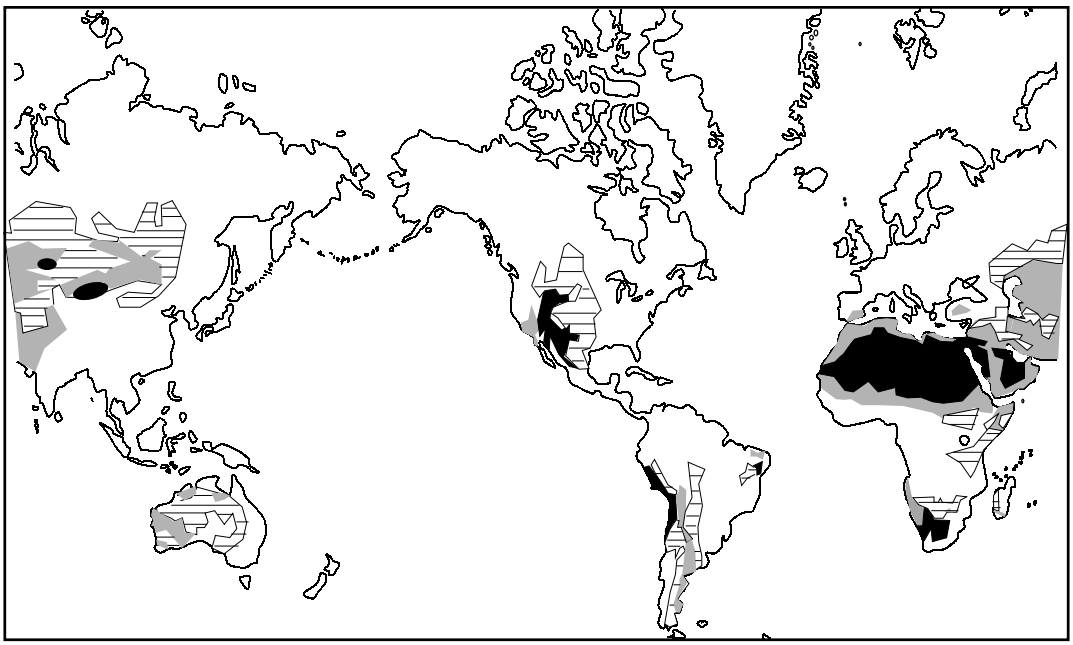
[4]

TOTAL / 9

QUESTIONSHEET 13

Do not write in margin

The map shows the scale of world desertification.



(a) Define the term ‘desertification’.

.....

.....

.....

[2]

(b) Suggest why many countries in Africa are experiencing severe problems of productivity.

.....

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.....

.....

[4]

(c) Outline how desertification may affect climate.

.....

.....

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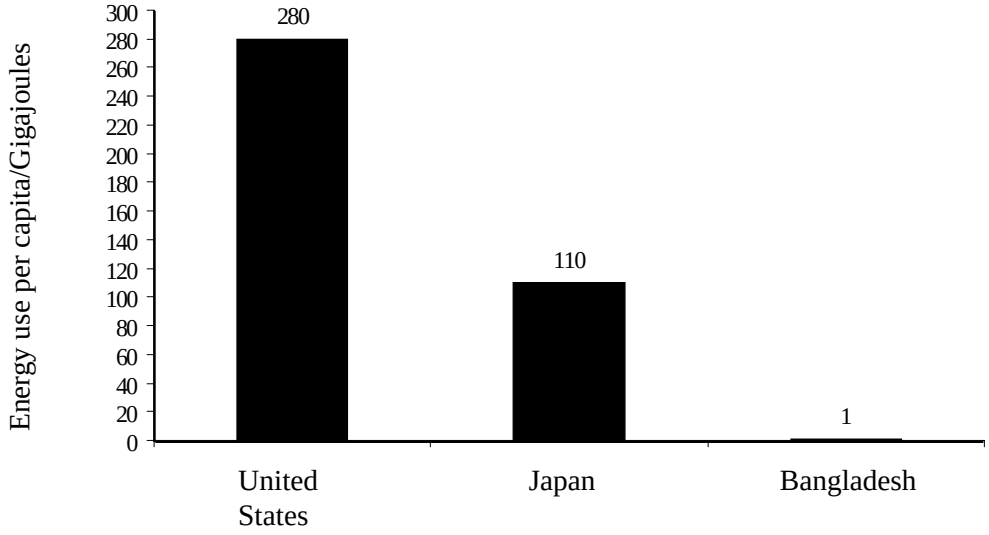
[3]

TOTAL / 9

Do not write in margin

QUESTIONSHEET 14

The diagram represents the per capita energy use in the United States, Japan and Bangladesh.



(a) Suggest three reasons for the differences in per capita energy use in the three countries.

1. .....

2. .....

3. .....

[3]

(b) Explain how each of the following can help to reduce total energy use:

(i) increasing consumption of vegetables or cereals and reducing consumption of animal products.

.....

.....

.....

.....

[3]

(ii) planting legumes between rows of non leguminous crops.

.....

.....

.....

.....

[2]

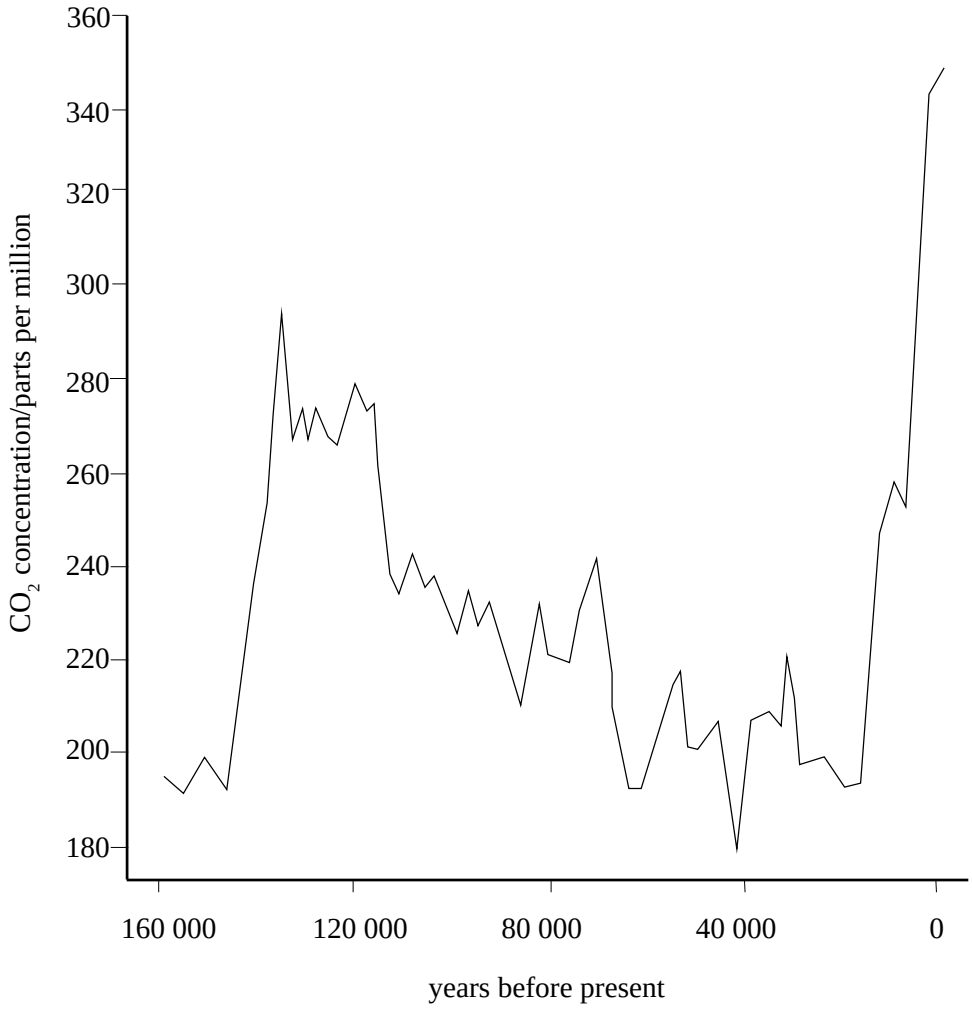
TOTAL / 8

MANAGEMENT OF HUMAN INFLUENCES ON ENVIRONMENT

QUESTIONSHEET 15

Do not write in margin

The graph shows changes in atmospheric carbon dioxide levels over the last 160,000 years.



(a) Describe and explain the causes of increasing atmospheric carbon dioxide concentration.

.....

.....

.....

.....

.....

..... [5]

(b) Name two other greenhouse gases.

1: .....

2: .....

[2]

TOTAL / 7

Do not write in margin

(a) Define the term biodiversity.

.....

.....

[2]

(b) Why is it considered important to maintain biodiversity?

.....

.....

.....

[3]

(c) Outline why global warming may accelerate loss of biodiversity.

.....

.....

.....

[2]

TOTAL / 7

QUESTIONSHEET 17

Do not write in margin

The Forest Authority have conducted trials into the use of fast growing energy crops such as willow coppice. Monocultures of densely planted willow trees are extremely fast growing and can be repeatedly harvested on a rotation of 3 - 5 years. The wood can then be normally processed to produce a biofuel.

(a) Outline the environmental advantages of biofuels.

.....

.....

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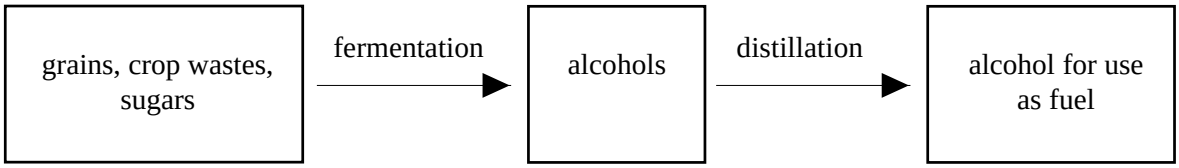
.....

.....

[4]

The diagram below shows stages in the production of alcohol to be used as fuel.



(b) Outline one advantage and one disadvantage of this technique.

Advantage: .....

Disadvantage: .....

[2]

TOTAL / 6

QUESTIONSHEET 18

Do not write in margin

The table below shows typical values of biochemical oxygen demand (BOD) of a clean river and during pollution events.

Condition/nature of pollution	BOD/mg dm^{-3} O_2
Clean	0.5-7.0
Treated sewage	3.0-50.0
Untreated sewage	200.0 - 800.0
Silage (liquor from decomposing grass)	60,000

(a) Define the term 'biochemical oxygen demand'.

.....

.....

.....

[2]

(b) Suggest an explanation for the difference in the BOD of treated and untreated sewage.

.....

.....

.....

.....

[3]

(c) Explain the consequence of silage liquor leaking into a river.

.....

.....

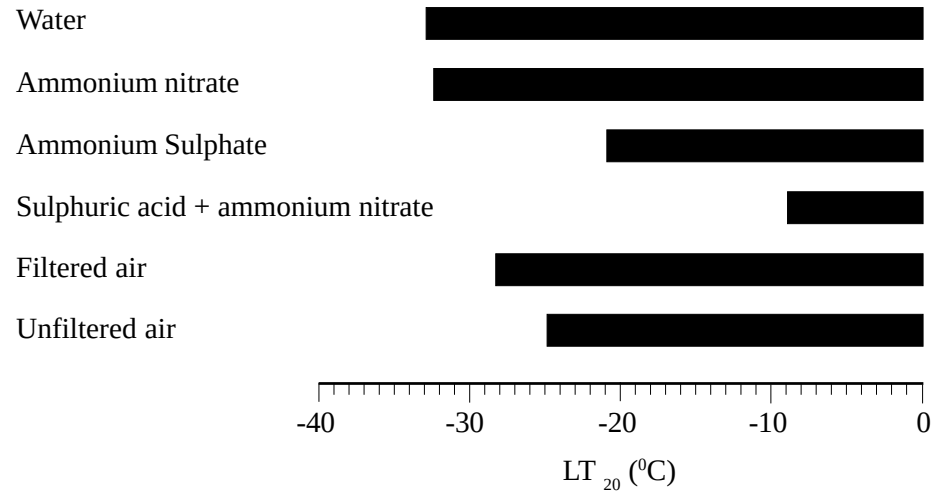
[2]

TOTAL / 7

QUESTIONSHEET 19

Do not write in margin

Seedlings of Norway spruce were exposed to acid mists over one growing season. The seedlings were then exposed to freezing temperatures. From these investigations scientists were able to identify the freezing temperatures at which 20% shoot death occurred (LT_{20} ^0C). The results are shown in the graph below.



(a) State the LT_{20} for seedlings exposed to:

(i) filtered air.

.....

[1]

(ii) sulphuric acid and ammonium nitrate.

.....

[1]

(b) What are the implications of these results?

.....

.....

.....

[2]

(c) How do acid mists arise?

.....

.....

..... [2]

TOTAL / 6

QUESTIONSHEET 20

Do not write in margin

The table below shows the composition of domestic waste in three cities. In each city, it is planned to use the domestic waste to produce biogas.

	UK City	Far East City	Middle East City
Vegetable %	28	75	50
Paper %	37	2	16
Metals %	9	0.1	5
Glass %	9	0.2	2
Textiles %	3	3	3
Plastic %	2	1	1
Miscellaneous %	12	18.7	23
Weight/person/day	0.845 kg	0.4115 kg	1.060 kg
Density kg/m^3	132	570	211

(a) What is biogas?

.....

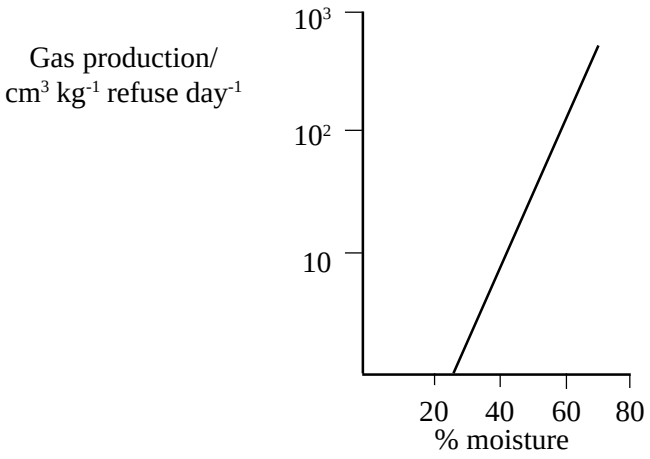
..... [2]

(b) Which city's waste is likely to produce the most biogas per kilogram of waste? Explain your answer.

.....

..... [2]

The graph shows the relationship between the moisture content of domestic waste and the volume of gas produced from that waste.



(c) (i) Suggest an explanation for the relationship shown.

.....

.....

..... [2]

(ii) Suggest why, even though typical UK waste has a moisture content of 30%, there are no plans to add water to UK landfill sites.

.....

..... [2]

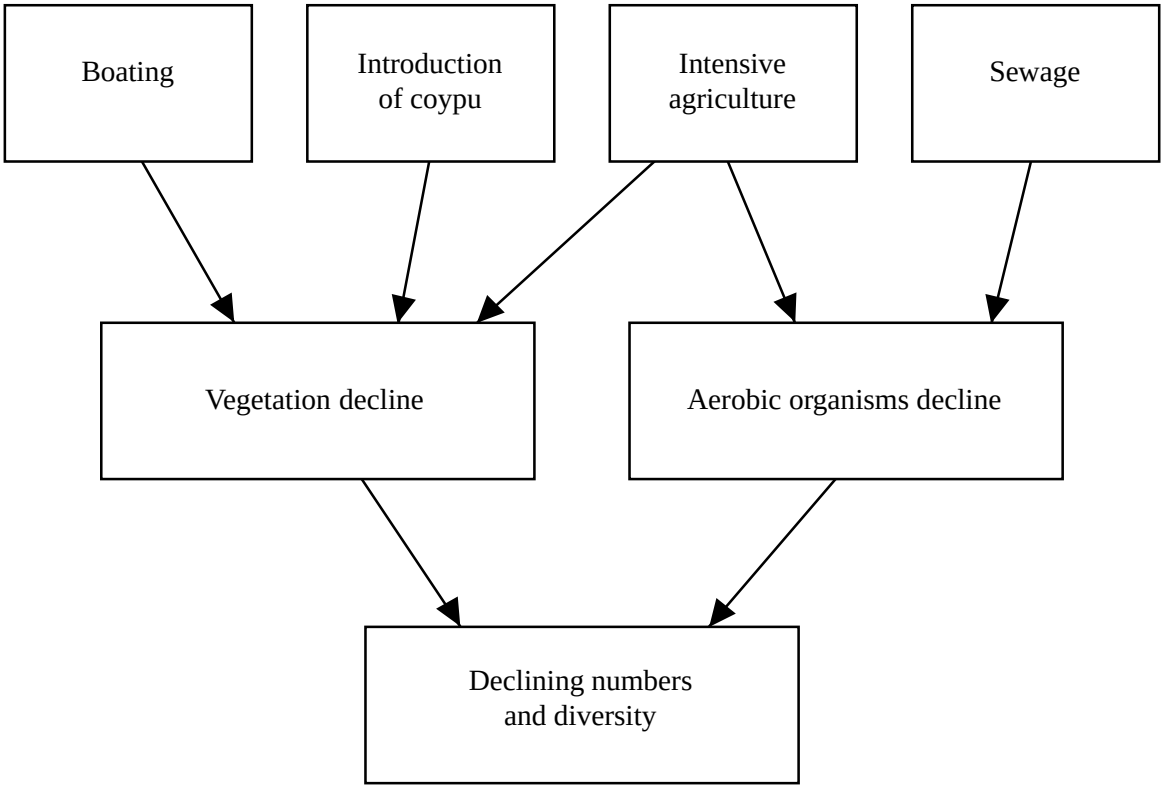
TOTAL / 8

MANAGEMENT OF HUMAN INFLUENCES ON ENVIRONMENT

QUESTIONSHEET 21

Do not write in margin

The diagram shows some of the causes and consequences of eutrophication of the Norfolk Broads.



(a) Explain how each of the following may contribute to eutrophication.

(i) introduction of coypu.

.....

.....

.....

[2]

(ii) intensive agriculture.

.....

.....

[2]

(b) Explain why phosphate is more often the limiting factor to lake productivity than nitrate.

.....

.....

[2]

TOTAL / 6