Human Influences on Ecosystems Question Paper 8

Level	IGCSE
Subject	Biology
Exam Board	CIE
Торіс	Human Influences on Ecosystems
Paper Type	(Extended) Theory Paper
Booklet	Question Paper 8

Time Allowed:	69 minutes	
Score:	/57KY ON LIN	
Percentage:	/100	

- 1 Acid rain is a serious environmental problem in some areas of the world. Lakes in Canada, Norway and Scotland are highly acidic as a result of acid rain.
 - Fig. 4.1 shows a cause of acid rain.



anir	рН								
group	examples	7.0	6.5	6.0	5.5	5.0	4.5	4.0	3.5
	trout								
fish	bass								
	perch								
amphihiana	frogs								
amphibians	salamanders								
molluscs	clams								
	snails			_					
crustacean	crayfish								
	mayfly larvae								
Insects	blackfly larvae								

Fig. 4.2 shows the pH ranges that some animals that live in lakes can tolerate.



(c)	Sta	te one feature of molluscs that is not a feature of crustaceans.	[1]
(d)	Usi	ng the information in Fig. 4.2,	
	(i)	name an animal that could be found in a lake with a pH of 4.0;	[1]
	(ii)	name the animals that are most sensitive to a decrease in pH;	[1]
	(iii)	suggest why some animals cannot tolerate living in water of pH as low as 4.0.	
			[2] 10]
			-

2 The highest yields of potatoes are obtained in the USA. In Bangladesh they are very much lower. Scientists investigated the effects of improving soil fertility on the growth and yields of potatoes in Bangladesh.

They carried out an investigation by dividing a field into four plots, **E** to **H**. The potatoes in each plot received different treatments:

- E no fertiliser or manure
- **F** manure only
- G chemical fertiliser only
- H manure and chemical fertiliser

The scientists measured different aspects of growth and final yield of the potato plants. Their results are shown in Table 3.1.

plot	treat	mean plant height at maturity / cm	mean fresh mass of potato tubers per plant / g	yield of potato tubers / tonnes per hectare
E	no fertiliser or manure	46.2	1	12.6
F	manure only	59.3	285.0	19.3
G	chemical fertiliser only	66.1	3	21.2
н	manure and chemical fertiliser	71.5	3	24.3

(a) The yield of potato tubers was greater in plot H than in plot E.

Calculate the difference in yield as a percentage of the yield in plot **E**. Show your working.

Answer = ____% [2]

(ii) Suggest **and** explain the importance of increased plant height in the production of tubers.

[2]

(iii) Describe the effect of adding manure and chemical fertilisers on the yield of potato tubers.

..... [3] Manure and chemical fertilisers provide plants with nitrate ions. (iv) Explain how extra nitrate ions in the soil may have increased the yield of the potatoes. [2] (v) State why plot E was included in this investigation. [1] (b) Discuss the advantages and disadvantages of adding chemical fertilisers to crops. _____ [5] [Total: 15]

3 Carbon dioxide and methane are two important greenhouse gases. The effect of human activities in increasing the concentration of greenhouse gases, such as carbon dioxide and methane, is known as the enhanced greenhouse effect.





Fig. 6.1

(a) Using information in Fig. 6.1, describe the trend in the concentrations of carbon dioxide and methane over the past 1000 years.

[3]

(b) Suggest and explain reasons for the trend in the concentrations of carbon dioxide and methane that you described in (a).

(c) Explain how gases, such as those shown in Fig. 6.1, contribute to the greenhouse effect.

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	1011		
			[3]

(d) People are encouraged to recycle materials, such as paper and plastics.

Discuss the advantages of recycling materials, such as paper and plastics.

	[3]

[Total: 13]



4 In many parts of the world, raw sewage drains into rivers. Raw sewage contains organic matter which acts as food for bacteria. The breakdown of organic matter by bacteria has an effect on the oxygen concentration and species of invertebrate animals in rivers.



Fig. 5.1 shows the changes in oxygen concentration along a river.



Table 5.1 shows the invertebrate animals at seven sampling stations, **A** to **G**, along the river.

5.1
5.'

key

 invertebrate animal present

invertebrate		sampling stations									
animals	Α	В	С	CT	D	VONI	Ε		F	G	
stonefly nymph	\checkmark		1				.		-	\checkmark	
freshwater shrimp	\checkmark			U		10N -			\checkmark	\checkmark	
caddis fly larva	\checkmark								\checkmark	\checkmark	
mayfly nymph	\checkmark	\checkmark					\checkmark		\checkmark	\checkmark	
midge larva	\checkmark	\checkmark	\checkmark				\checkmark		\checkmark	\checkmark	
rat-tailed maggot		\checkmark	\checkmark		\checkmark						
water louse	\checkmark	\checkmark					\checkmark		\checkmark	\checkmark	
wandering snail							\checkmark		\checkmark	\checkmark	
tubifex worm	\checkmark	\checkmark	\checkmark		\checkmark		\checkmark		\checkmark	\checkmark	

(a) (i) Describe the changes that occur to the oxygen concentration in the river as shown in Fig. 5.1. You will gain credit for using the data in Fig. 5.1 in your answer.

	[4]
Name the invertebrate animal that is only found in water with the highest oxygen concentration.	
	[1]
Name the two invertebrate animals that tolerate the lowest oxygen concentration	s.
	[1]
Suggest and explain the changes in the number of different species of invertebra	ite
animals along the river, as shown in Table 5.1.	
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	[3]
	Name the invertebrate animal that is only found in water with the highest oxygen concentration. Name the two invertebrate animals that tolerate the lowest oxygen concentration Suggest and explain the changes in the number of different species of invertebra animals along the river, as shown in Table 5.1.

Sewage treatment works receive raw sewage.

This sewage contains food molecules, such as cellulose, starch, protein and fat.

(b) Explain how bacteria breakdown these nutrient molecules.

					[4]

The concentration of nitrate ions is often very high in the water leaving a sewage treatment works.

In some places, the water passes through a series of reed beds as shown in Fig. 5.2.

The water leaving the reed beds and entering the river contains very low concentrations of nitrate ions.



Fig. 5.2

(c) Explain two ways in which the concentration of nitrate ions may be reduced as the water flows through the reed beds.

..... [3] (d) Some bacteria that live in reed beds release methane. Other sources of methane are cattle and flooded rice fields. Explain the environmental consequences of an increase in the methane concentration in the atmosphere. [3] [Total: 19]