Human Influences on Ecosystems

Question Paper 9

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Human Influences on Ecosystems
Paper Type	(Extended) Theory Paper
Booklet	Question Paper 9

Time Allowed: 54   minutes

Score: /45

Percentage: /100

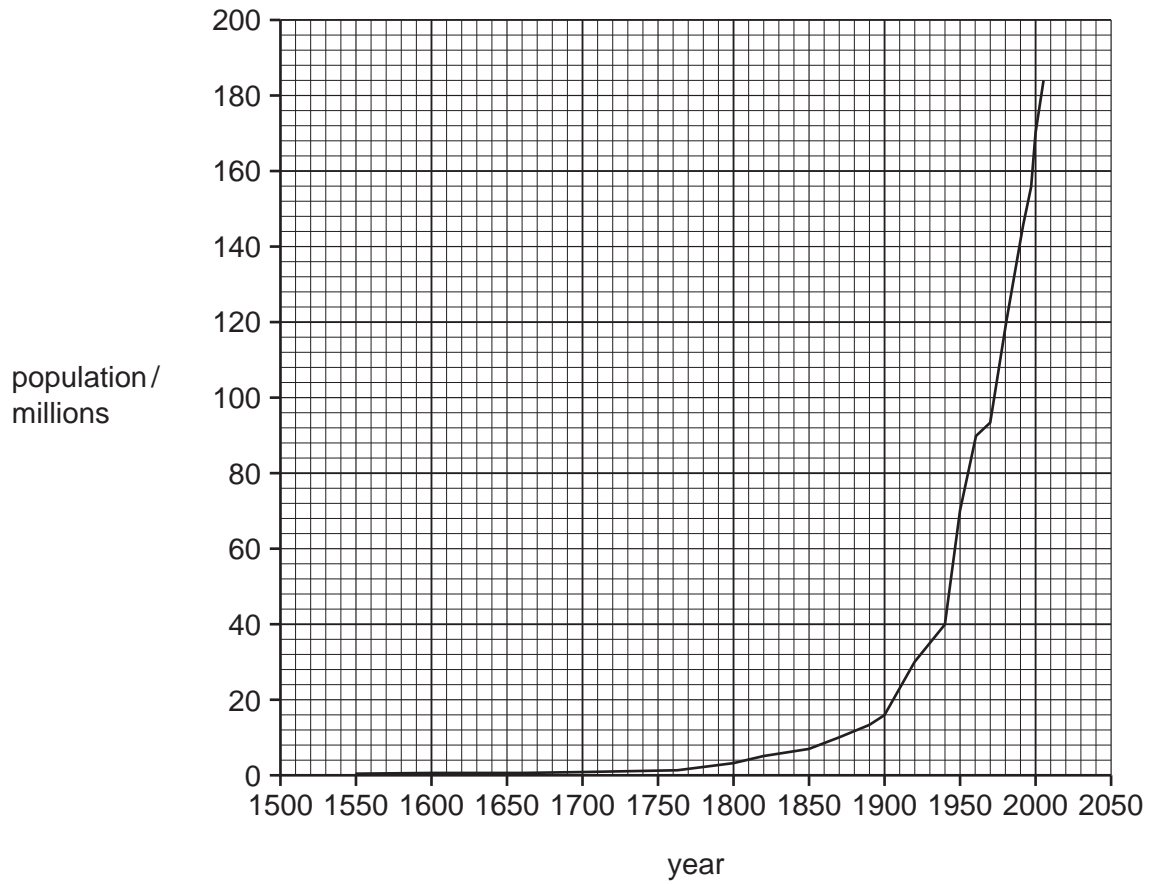1   The growth of the human population of Brazil between the years 1500 and 2005 is shown in Fig. 4.1.

Fig. 4.1

(a) Compare the growth curve shown in Fig. 4.1 with a sigmoid growth curve.

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.... [3]

Table 4.1 shows information on deforestation in four South American countries that have extensive tropical rainforests. (1 hectare = 10 000 m^2.)

Table 4.1

country	area of forest / millions of hectares		deforestation - area of forest lost as percentage of forested area in 1990
	1990		
Brazil		478.0	
Bolivia	63.0	59.0	6.4
Colombia	61.7	61.0	1.1
Peru	70.4	69.0	2.0

(b) (Calculate the percentage loss of forest in Brazil between 1990 and 2005.

Show your working.

Answer .... % [2]

(ii) State two reasons why forests are cut down.

1. ....

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2. ....

.... [2]

(c) Outline the effects of large scale deforestation on the following aspects of the environment.

number of species ....

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soils ....

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rivers ....

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atmosphere ....

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[8]

(d) Drinks cartons have proved difficult to recycle because they are made of plastic, aluminium and paper. A factory in Brazil uses new technology to recycle all these components as raw materials for the packaging industry.

Explain the importance for the environment of developing technologies for recycling materials, such as those found in drinks cartons.

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.... [3]

[Total: 18]

2   Lake Victoria is the largest tropical lake in the world. Until the 1960s it provided an ecosystem with habitats for 500 species of small cichlid fish. They feed on algae (aquatic plants). Prawns also feed on algae.

Nile perch were introduced into the lake. These fish are excellent food for humans, as well as providing sport for tourists. The Nile perch eat cichlids.

Deforestation of the lake shore and pollution by humans caused eutrophication and resulted in a huge reduction in cichlid numbers. However, the Nile perch are able to survive in poor quality water, even when the oxygen level is low. As the cichlid population dropped, prawn numbers increased and Nile perch now eat them.

(a) Define the term *ecosystem.*

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.... [2]

(b) Using information in the text above, state two reasons why Nile perch were introduced into Lake Victoria.

1. ....

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2. ....

.... [2]

(c) Complete the table to identify at which trophic level each of the organisms named in the text are feeding.

algae   cic   fish   human   Nile perch   prawn

trophic level	organism(s)
producer	
herbivore	
carnivore	

[3]

(d) Explain how eutrophication could have resulted in a reduction in the numbers of cichlid fish.

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.... [4]

[Total: 11]

3 Hormones are secreted by glands or made artificially by drug companies.

(a) **(i)** Name the gland that secretes testosterone.

.... [1]

(ii) State why testosterone can improve sporting performance.

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.... [1]

(iii) Describe the role of progesterone in the menstrual cycle.

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.... [1]

(iv) Synthetic progesterone is found in oral contraceptives.

Name **one** other hormone often found in oral contraceptives.

.... [1]

Water entering two sewage works, **A** and **B**, was tested for the presence of four hormones.

The testing was repeated on water that left the sewage works to flow into lake **A** and lake **B**.

The results of the tests on the water samples are shown in Table 5.1.

Table 5.1

hormone	concentration of hormones at sewage works / ng per dm^3			
	A		**B**	
	before sewage treatment	after sewage treatment including ozone and chlorine	before sewage treatment	after sewage treatment including chlorine alone
oestrogen	not measurable	not measurable	0.1	not measurable
synthetic progesterone	8.5	8.0	4.5	4.6
natural progesterone	2.5	2.8	2.4	2.7
testosterone	15.6	3.7	2.7	3.1

(b) Explain which water sample was most polluted with hormones **before** sewage treatment. Use data from Table 5.1 to support your answer.

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.... [3]

(c) One reason for treating sewage is to reduce the concentration of hormones in the environment.

    (i) Chlorine was used in the sewage treatment of both lakes.

       Describe the effect that chlorine had on the hormone concentrations in the water. Use data from Table 5.1 to support your answer.

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       .... [2]

    (ii) State the main purpose of chlorine in sewage treatment.

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(d) Describe the negative consequences of letting untreated sewage flow into lake ecosystems.

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[Total: 16]