



CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
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8291/23

October/November 2021

1 hour 30 minutes

You will need: Answer booklet/paper

- Section A: answer **all** questions. Write your answer to each question in the space provided on the question paper.
- Section B: answer **one** question. Write your answer on the separate answer booklet/paper provided.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.
- At the end of the examination, fasten all your work together. Do **not** use staples, paper clips or glue.

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [].

For Examiner's use	
Section A	
1	
2	
Section B	
Total	

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[Turn over

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

- 1 (a) Table 1.1 shows the number of marine wildlife affected by marine debris in one year.

Table 1.1

wildlife group	marine debris								
	bottles	cans	lobster and fish traps	fishing hooks	fishing lines	fishing nets	plastic bags	string and rope	other
amphibians	1	0	0	0	3	1	6	0	1
birds	2	0	0	5	45	53	19	10	4
fish	5	1	2	1	48	11	11	7	3
invertebrates	6	2	1	1	14	12	6	13	0
mammals	0	0	0	3	6	1	6	6	1
reptiles	0	0	0	0	10	4	1	3	1

- (i) State which wildlife group is affected by every type of marine debris shown in Table 1.1.

..... [1]

- (ii) State which wildlife group is most affected by marine debris shown in Table 1.1.

..... [1]

- (iii) Suggest **two** sources of the marine debris shown in Table 1.1.

.....

..... [2]

- (iv) Calculate the percentage of all mammals in Table 1.1 affected by plastic bags.

..... % [1]

(b) Fig. 1.1 shows part of an ocean food web.

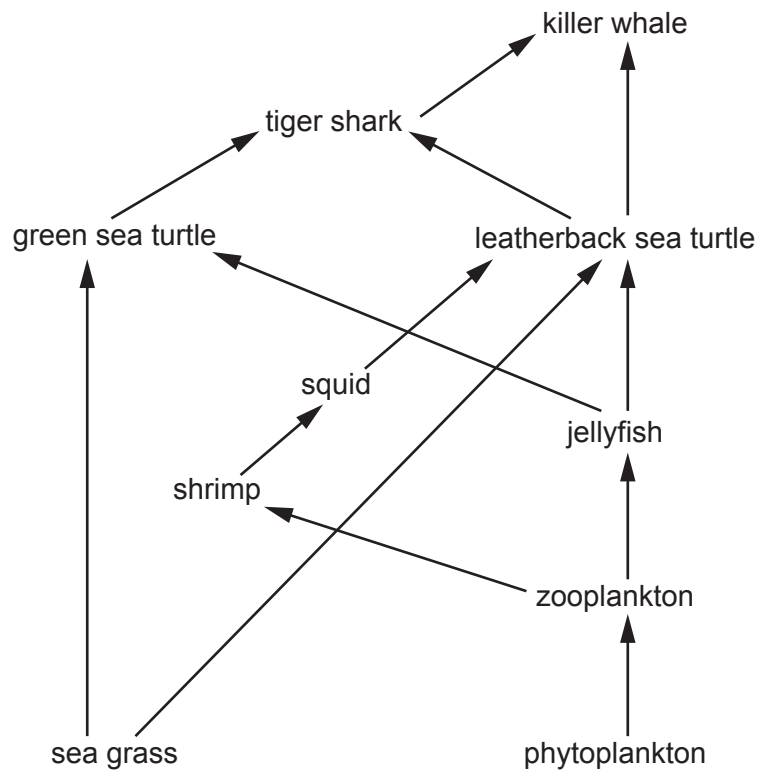


Fig. 1.1

(i) State what the arrows in the food web shown in Fig. 1.1 represent.

.....
 [1]

(ii) Sea turtles are under threat because of plastic bag pollution in the sea. The turtles mistake the bags for jellyfish.

Explain the effects of a reduction in sea turtle numbers on the food web shown in Fig. 1.1.

.....

 [4]

(iii) Suggest strategies to prevent plastic bag pollution reaching oceans.

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..... [4]

(c) Fig. 1.2 shows the net primary productivity of different aquatic ecosystems.

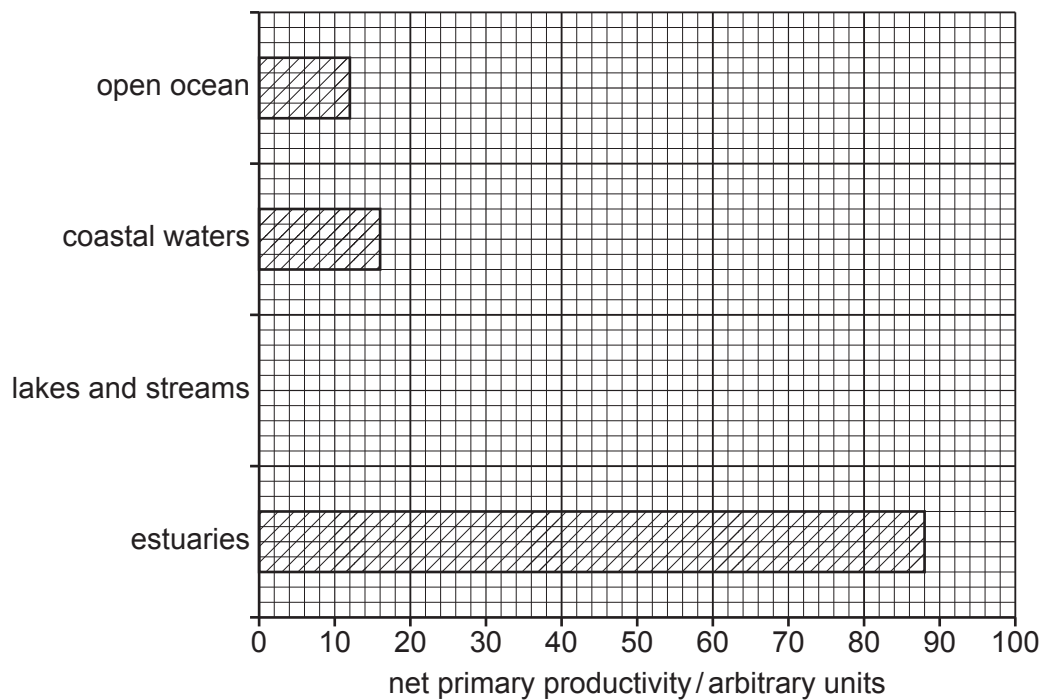


Fig. 1.2

- (i) Complete the bar chart in Fig. 1.2 to show a net primary productivity of 23 arbitrary units for lakes and streams. [1]
- (ii) Suggest why net primary productivity is low in open oceans.

.....

.....

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..... [2]

- (iii) An estuary is found where a river meets coastal waters.

The net primary productivity of an estuary is high because there is a high concentration of nutrients.

Suggest reasons why the concentration of nutrients is high.

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..... [3]

[Total: 20]

- 2 Fig. 2.1 shows a habitat changing over time from open water to mixed woodland.

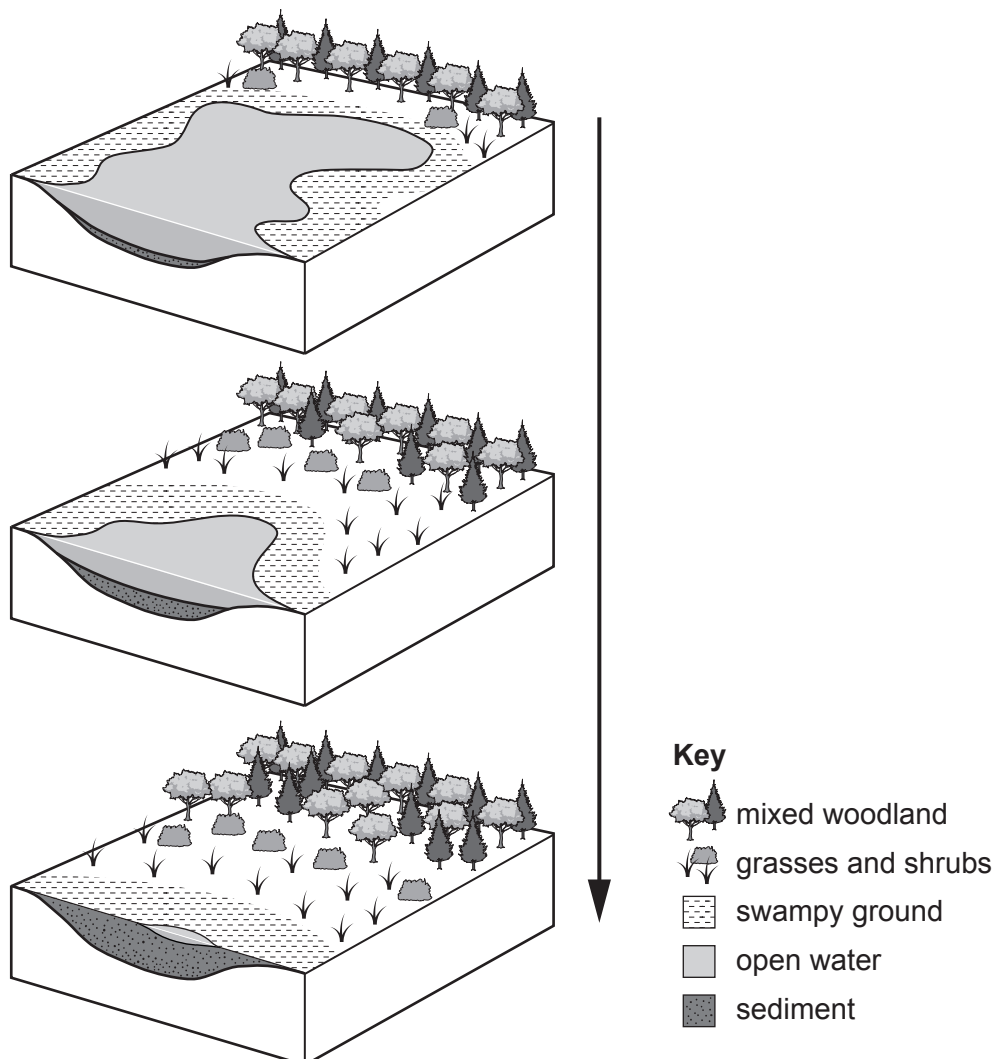


Fig. 2.1

- (a) (i) State the process shown in Fig. 2.1.

..... [1]

- (ii) Explain the reasons for the changes shown in Fig. 2.1.

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..... [6]

- (iii) Explain what is meant by abiotic and biotic factors of an ecosystem.

Give an example for each.

abiotic
.....
.....

example

biotic
.....
.....

example [4]

(b) Table 2.1 compares subsistence farming with commercial farming.

Table 2.1

factor	subsistence farming	commercial farming
amount of produce sold	low	high
destination of foods	consumed on farm or locally	high proportion processed by food manufacturers
power source	animals	fossil fuel, electricity
plant nutrition	organic e.g. legumes, ash, bone, manure	chemical fertilisers
pest control	crop rotation, intercropping	commercial pesticides
weed control	rotations, hoeing, hand picking	commercial herbicide
seed	from own crops	from commercial grower
livestock feed	from own crops, fodder	from commercial feed manufacturer

(i) Explain how commercial farming described in Table 2.1 can lead to loss of local habitats.

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..... [4]

(ii) Subsistence farmers often clear land for crops.

Explain why clearing land leads to loss of biodiversity.

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..... [3]

- (iii) Describe a strategy to prevent land being cleared for crops.

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..... [2]

[Total: 20]

Section B

Answer **one** question from this section.

Write your answers on the separate answer paper provided.

- 3** Animal breeding programmes and release into National Parks is one method of wildlife management.

Fig. 3.1 shows media reports about deaths of rare animals connected to this method of wildlife management.

13/02/2019

A rare Amur tiger was found dead at an animal breeding centre in Europe, just four days after the death of a Sumatran tiger at a zoo.

15/02/2019

Another rare tiger has died after a fight at a zoo in Europe. The 13-year-old Amur tiger entered an area where two other tigers were being held as a tourist attraction.

28/07/2019

An adult lion called Skye was encouraged out of a National Park, using food as bait, and shot by a hunter who had paid for the experience.

This follows a similar event in 2015, when a lion called Cecil was killed. He was also encouraged out of a National Park using food and was shot. The lion was well known to visitors and appeared to enjoy human contact.

Fig. 3.1

- (a)** Animal breeding programmes and release into National Parks is one method of wildlife management.

With reference to Fig. 3.1 explain the advantages and disadvantages of this method of wildlife management. [10]

- (b)** Using examples, evaluate the success of methods to conserve the biodiversity of ecosystems, other than animal breeding programmes and release into National Parks. [30]

[Total: 40]

- 4 Fig. 4.1 is a graph of average Arctic sea ice extent for March each year from 1979 – 2019.

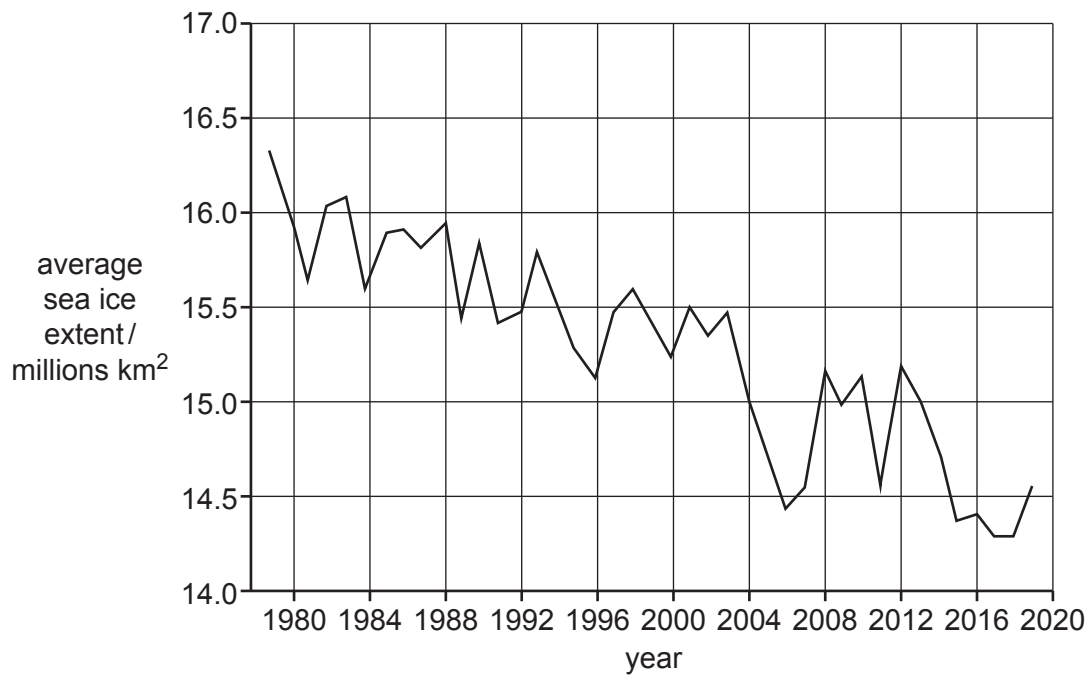


Fig. 4.1

- (a) Describe and explain the changes in Arctic sea ice extent shown in Fig. 4.1. [10]
- (b) Using examples, evaluate the success of different international protocols in managing environmental change. [30]

[Total: 40]

5 Fig. 5.1 is a graph showing human population from 1800 with a prediction to 2100.

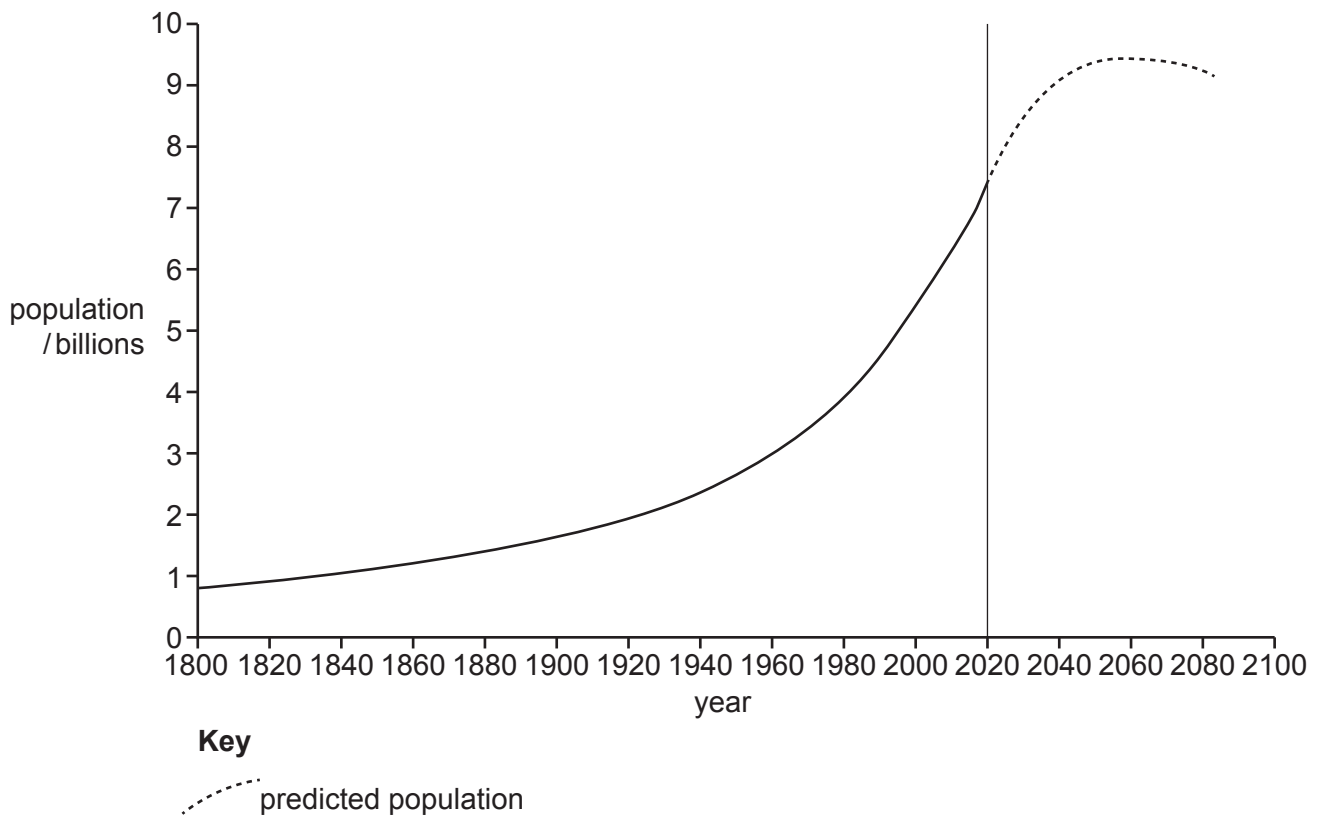


Fig. 5.1

- (a) Describe and explain the trend shown in Fig. 5.1. [10]
- (b) Assess the difficulty of providing resources for the human population. Use examples from countries with contrasting levels of income. [30]

[Total: 40]

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