Centre Number	Candidate Number

Candidate Name _____

CAMBRIDGE INTERNATIONAL EXAMINATIONS

General Certificate of Education Ordinary Level

FISHERIES SCIENCE 5151/1

PAPER 1

OCTOBER/NOVEMBER SESSION 2002

1 hour 30 minutes

Candidates answer on the question paper.
No additional materials

TIME 1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page and on any separate answer paper used.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

This question paper consists of 16 printed pages.

SP (AT/KN) S28593/4

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

[Turn over

1 **(a)** Fig. 1.1 shows oceans and seas. On Fig. 1.1, label the Sea of Japan, the Arctic Ocean and the Red Sea. [3]

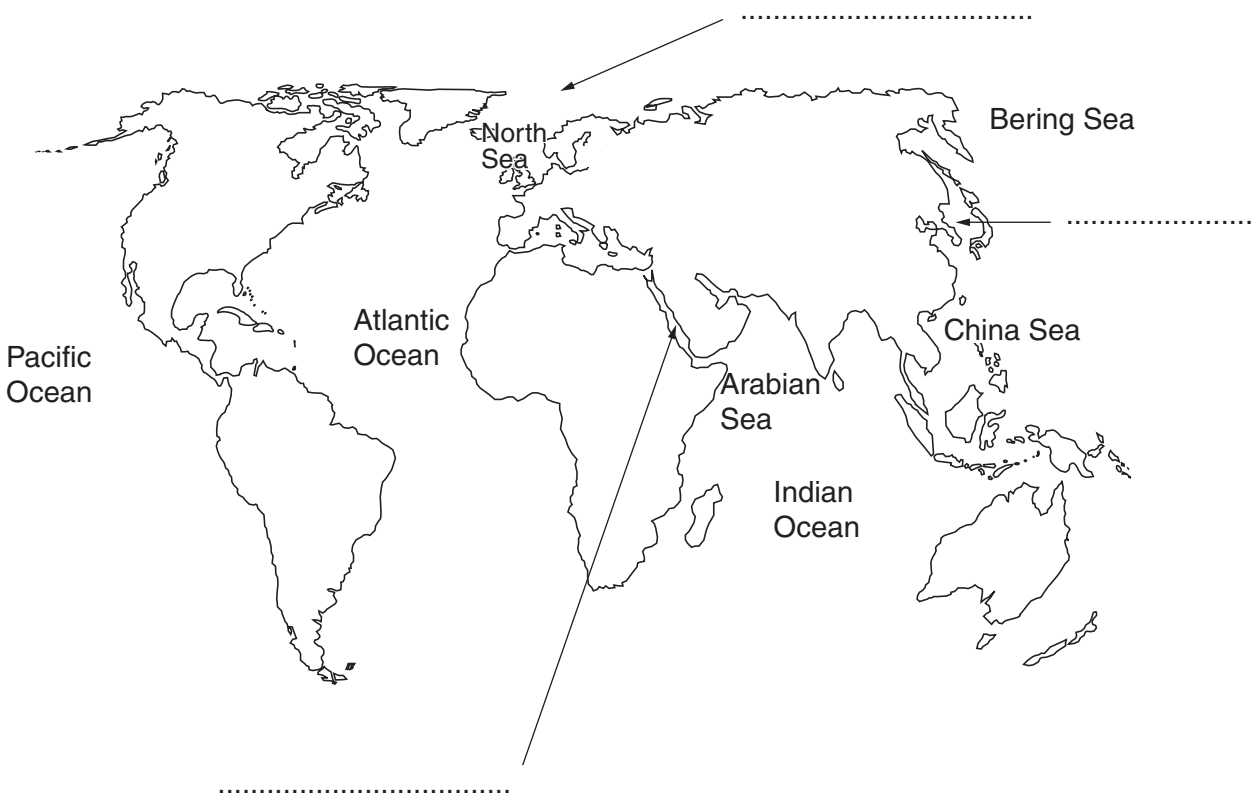

Fig. 1.1

(b) State the difference between a lake (such as the Caspian Sea) and a true sea.

.....

.....[1]

(c) Define an ocean.

.....[1]

(d) State why the ocean basins are continuously changing in size and shape.

.....

.....[1]

2 **(a)** Explain how each of the following use camouflage to avoid detection.

(i) octopus (Fig. 2.1)

.....

.....

.....

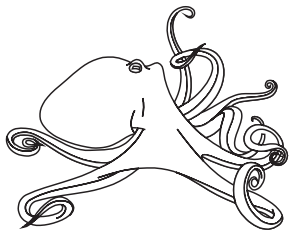

Fig. 2.1

(ii) shark (Fig. 2.2)

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.....

.....

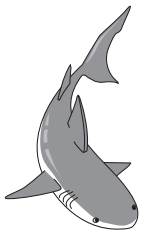


Fig. 2.2

(iii) butterfly fish (Fig. 2.3)

.....

.....

.....

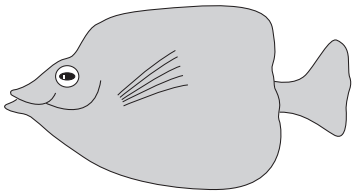


Fig. 2.3

(iv) eagle ray (Fig. 2.4)

.....

.....

.....

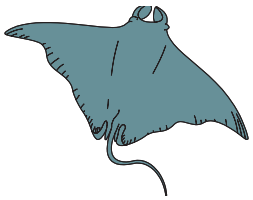


Fig. 2.4

(v) arrow worm (Fig. 2.5)

.....

.....

.....

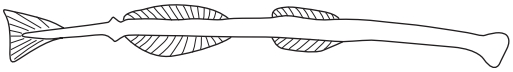


Fig. 2.5

[5]

(b) Describe how the clown fish is adapted to survive inside its host anemone.

.....

.....[2]

[Turn over

3 **(a)** Fig. 3.1 shows five fish labelled A, B, C, D and E. They are not all shown at the same scale. Use the key below to identify the fish A to E. Write the letter of each fish in the box next to its scientific name.

Key

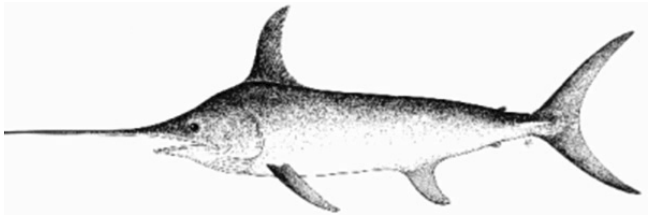
1	Upper jaw extended beyond lower jaw	2	
	Upper jaw not extended beyond lower jaw	4	
2	Dorsal fin like a sail	*Istiophorus platypterus*	☐
	Dorsal fin not like a sail	3	
3	Pelvic fins absent	*Xiphias gladius*	☐
	Pelvic fins present	*Makaira nigricans*	☐
4	Finlets present	*Rastrelliger kanagurta*	☐
	Finlets absent	*Pellona ditchela*	☐

[5]

(b) Name the phylum to which A to E all belong.

.....[1]

A



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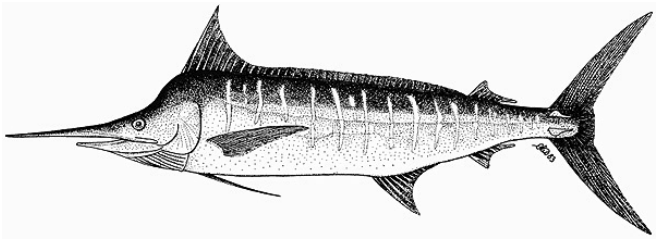
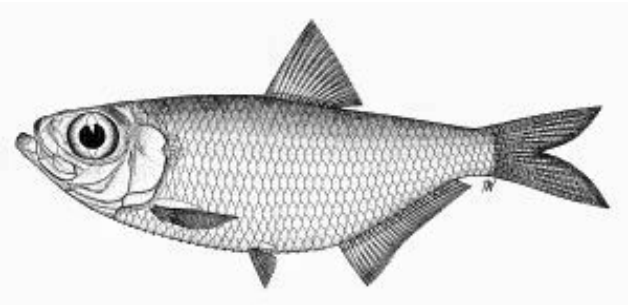
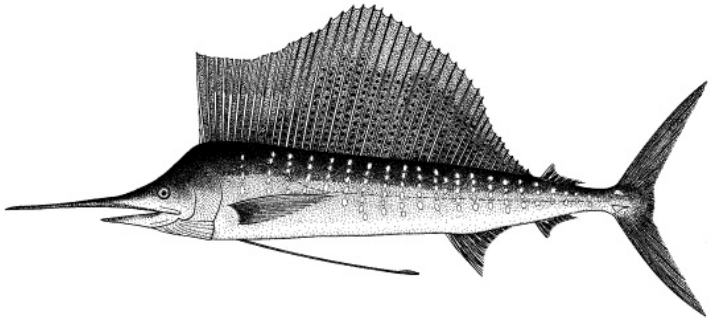


C



D



E

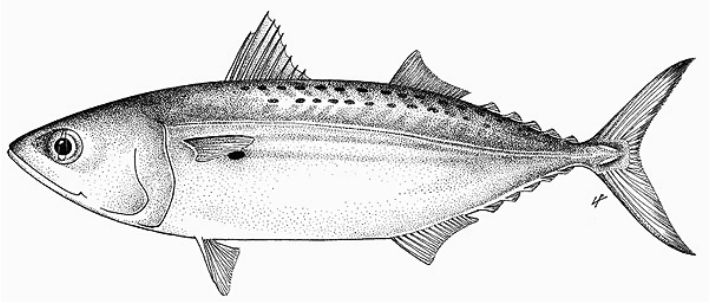


Fig. 3.1

[Turn over

(c) Fig. 3.2 shows a skipjack tuna.

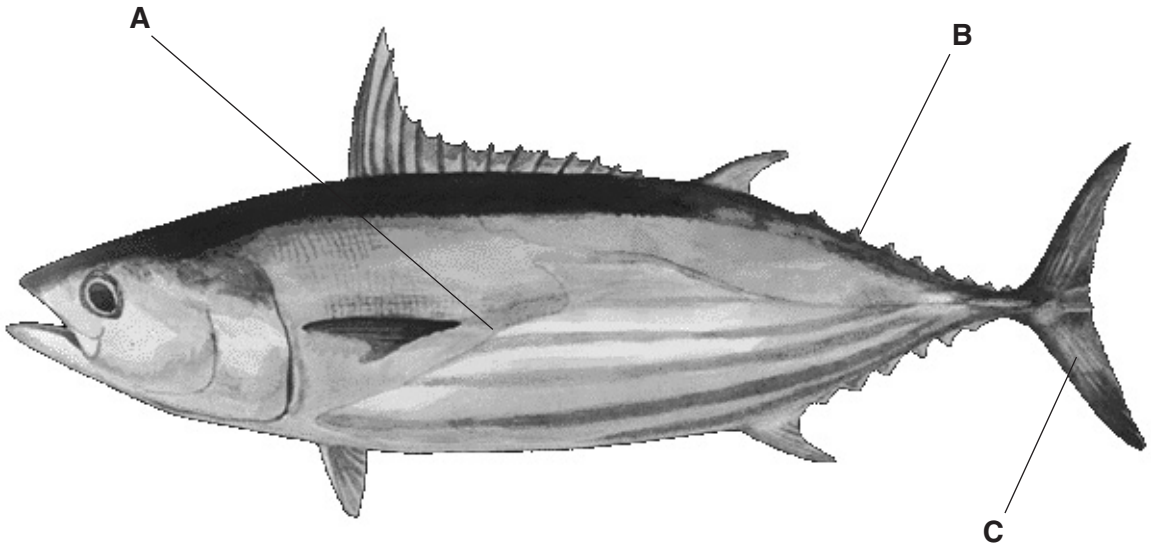


Fig. 3.2

(i) Give one function of each of the following parts:

A .....

B .....

C .....

[3]

(ii) Tuna have only a small swim bladder or, in some cases, none at all. Explain why tuna do **not** need a swim bladder.

.....

.....

.....[2]

4 Fig. 4.1 shows a horizontal section through a part of the body of a **teleost** fish.

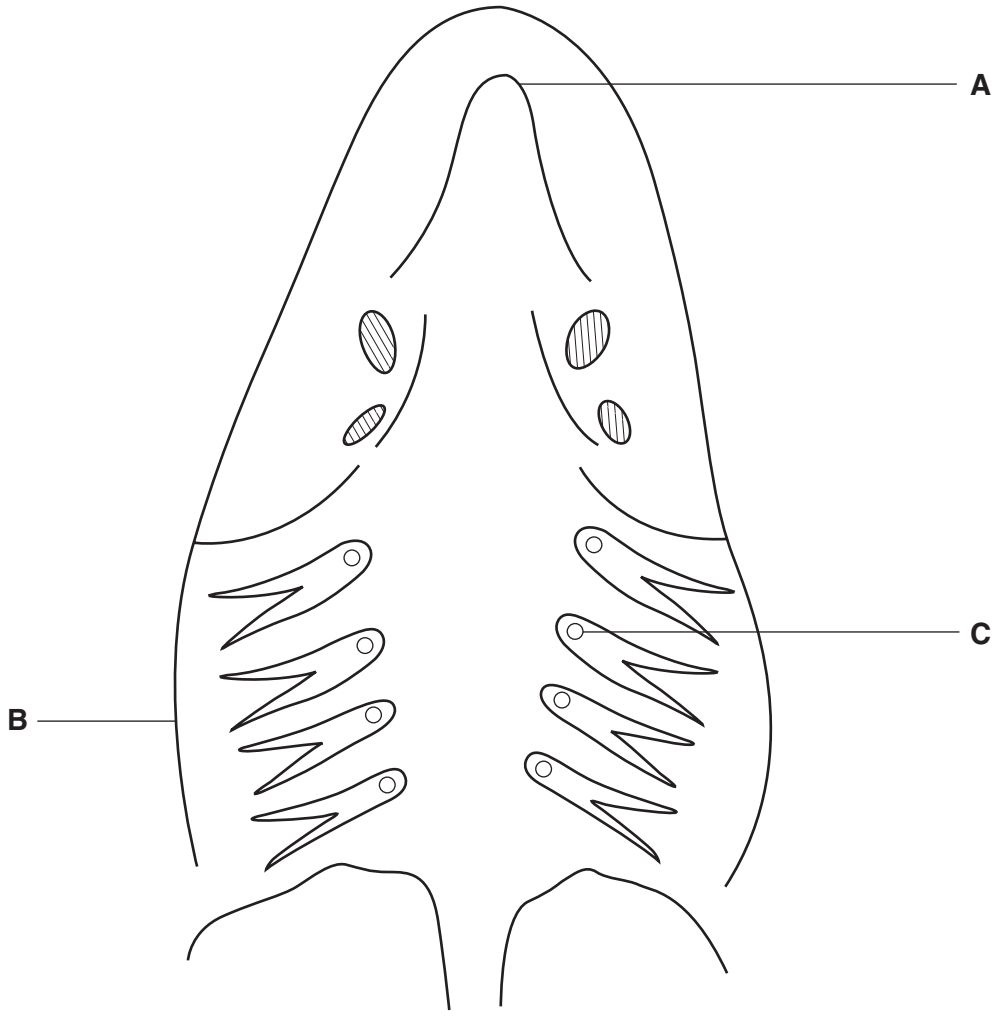


Fig. 4.1

(a) Through which part of the body is this section taken?

.....[1]

(b) Give the names of parts **A** to **C**.

A .....

B .....

C .....

[3]

(c) Tuna require large amounts of oxygen. State two ways the tuna is adapted to meet this need.

.....

.....

.....[2]

[Turn over

5 Pole and line fishing requires access to live bait.

(a) How can the monsoons affect the capture of live bait?

.....

.....

.....[2]

(b) Figs. 5.1 and 5.2 provide data on Maldivian live bait species.

The main live bait varieties in the Maldives

Dhivehi name	species	common name
Boadhi	Various species	Cardinalfishes
Bureki	*Lepidozygous tapeinosoma*	Fusilier Damselfish
Hondeli	*Spratelloides delicatulus*	Blue Sprat
Miyaren	*Encrasicholina heteroloba*	Shorthead Anchovy
Muguraan	Various species	Fusiliers
Nilamehi	*Chromis viridis*	Blue Damselfish
Rehi	*Spratelloides gracilis*	Silver Sprat
Thaavalha	Various species	Silversides/Hardyheads

Fig. 5.1

Average proportions of common live bait species

Dhivehi name	percentage
Boadhi & Fatha	10
Bureki & Nilamehi	1
Hondeli	5
Miyaren	7
Muguraan	37
Rehi	38
Thaavalha	1
Others	0.2

Fig. 5.2

State the common name for the two most frequently used Maldivian live bait species.

.....

.....[2]

(c) State two ways live bait can be kept prior to a fishing trip.

.....

.....

.....[2]

(d) Describe how the use of diving masks has improved the live bait catch.

.....

.....[2]

6 The diagrams below show four types of boat found in the Maldives.

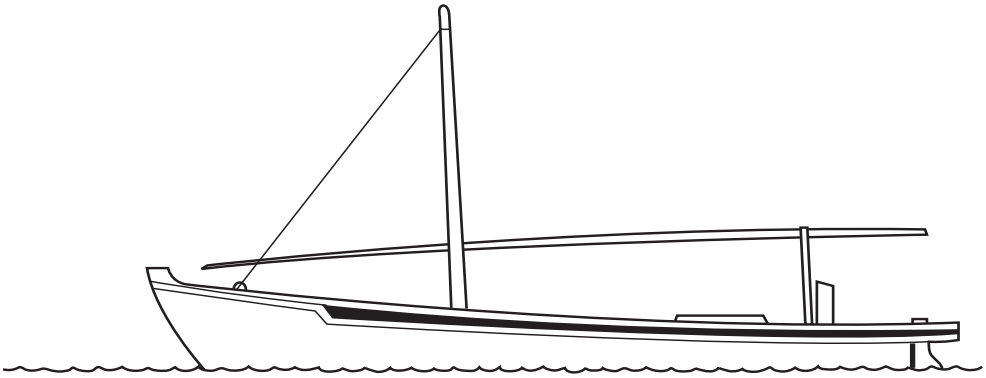


Fig. 6.1

Fig. 6.2

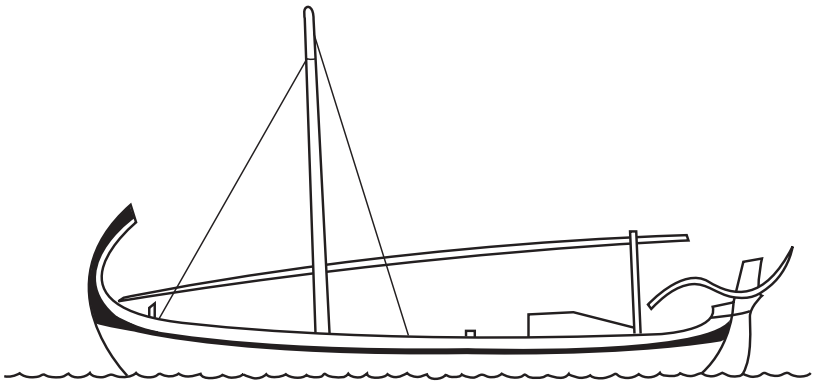


Fig. 6.3

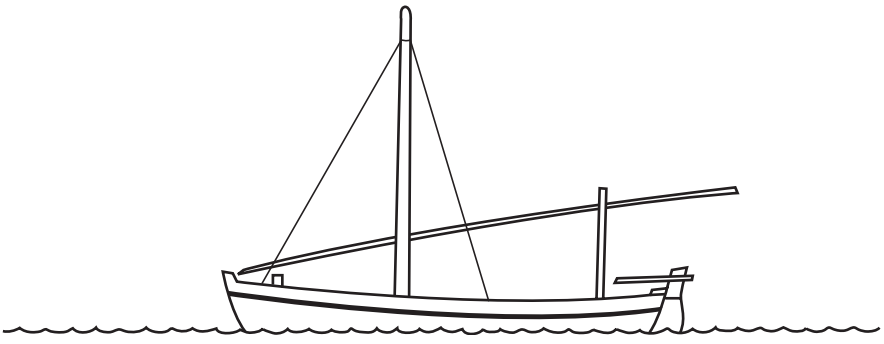


Fig. 6.4

(a) Give the name of the type of boat in each diagram.

type of boat in Fig. 6.1 .....

type of boat in Fig. 6.2 .....

type of boat in Fig. 6.3 .....

type of boat in Fig. 6.4 .....

[4]

(b) State two differences between the *mas dhoani* and the Mark II *mas dhoani*.

.....

.....

.....[2]

(c) Imported wood is used to construct the main frame of a Mark II *mas dhoani*. Where is the wood imported from?

.....[1]

7 A fisheries scientist collects and analyses data before making recommendations as to how stocks should be harvested.

(a) Describe how a fisheries scientist would measure the total length of a grouper. Include a drawing of the equipment in your answer.

.....

.....

.....

.....[5]

(b) Fig. 7.1 shows the lengths of ten groupers caught by the fisheries scientist.

length / cm
43
44
45
43
54
38
36
42
48
51

Fig. 7.1

Calculate the mean length, to the nearest centimetre, of these groupers. Show your working.

mean length = ...[3]

(c) The formula below is used to calculate the gonad index.

Gonad index = $(W/L^3) \times 10^8$

(i) What is the gonad index used to determine?

.....[1]

(ii) What do the letters in the formula represent? Give the units in which they are usually measured.

W = ... unit .....

L = ... unit .....

[2]

(d) **(i)** One method to determine the age of a fish is to examine skeletal structures. Name another common method.

.....[1]

(ii) Determining the age by skeletal structures such as scales is only suitable for temperate fish. Give one reason why this method cannot be used with tropical fish.

.....

.....[1]

8 Fig. 8.1 gives information about the export of groupers from the Maldives.

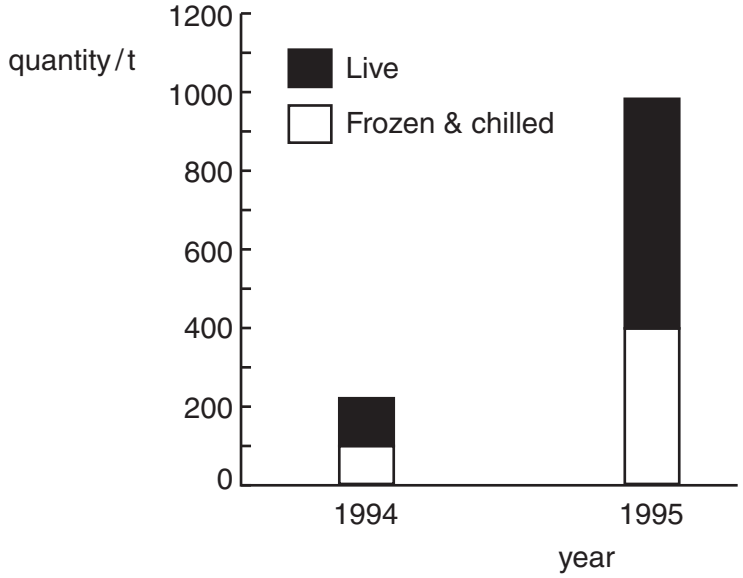


Fig. 8.1

(a) What was the export of frozen and chilled groupers in 1994?

.....

.....[1]

(b) What was the export of live groupers in 1995?

.....

.....[1]

(c) Why is grouper exported chilled or frozen when it has been killed?

.....

.....[1]

(d) Describe briefly how hand-operated hand-lining is done.

.....

.....[2]

9 **(a)** Read through the passage below on coral mining. Complete the passage using words from the list below.

aggregates coconut leaves concrete blocks construction deep water explosives export *faro* reefs house reefs iron bars local timber tourists

Corals can be mined from coral reefs. In the Maldives, mined corals have mainly been used for ..... purposes. Historically houses were built using ..... and ..... Corals used to be mined from reef flats of islands' ..... More recently, coral has been mined from ..... The coral is broken from the reef using .....

With increasing numbers of ....., the demand for coral has increased. In 1992 new regulations were introduced to control the mining of coral.

Alternatives to coral are being found such as ..... and imported ..... [9]

(b) Read the following passage.

> Applications are required to be submitted to the atoll offices by anyone needing corals to build any structures.
>
> Permission needs to be granted by the atoll office before any mining can be carried out.
>
> The island office is required to estimate how much coral is needed for the structure and hence should ensure that only the required amount is mined.
>
> Every island is required to keep a log book of the amount of corals mined.

How can the above practices help to protect the coral reefs?

.....[2]

[Turn over

10 The table of Fig. 10.1 shows data from a report dated 1990.

	Comoros	Maldives	Mauritius	Seychelles
population (× 1000)	672	182	1154	76
population density (per km^2)	360	610	566	167
population growth rate (%)	3.07	3.44	1.08	1.03
land area (km^2)	1862	298	2040	454
EEZ area (× 1000 km^2)	73	279	345	393
land:EEZ ratio	1:39	1:936	1:169	1:856
coastline length (km)	340	644	117	491

Fig. 10.1

(a) Which country has the highest population growth rate?

.....[1]

(b) Which country has the smallest land area?

.....[1]

(c) Suggest one ecological consequence of further increases in population density.

.....

.....[1]

(d) What is an EEZ and why is it important?

.....

.....

.....[2]

(e) What are the areas outside the EEZ called?

.....[1]