Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

7421719094

MARINE SCIENCE **9693/21**

Paper 2 AS Data-Handling and Free-Response **May/June 2018**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Section A
Answer **both** questions in this section.
Write your answers in the spaces provided on the Question Paper.

Section B
Answer **both** questions in this section.
Write your answers in the spaces provided on the Question Paper.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **9** printed pages and **3** blank pages.

CAMBRIDGE International Examinations

Section A

Answer **both** questions in this section.

1 Fig. 1.1 shows the global fishing catch for southern bluefin tuna, a large carnivorous fish, from 1951 to 2011.

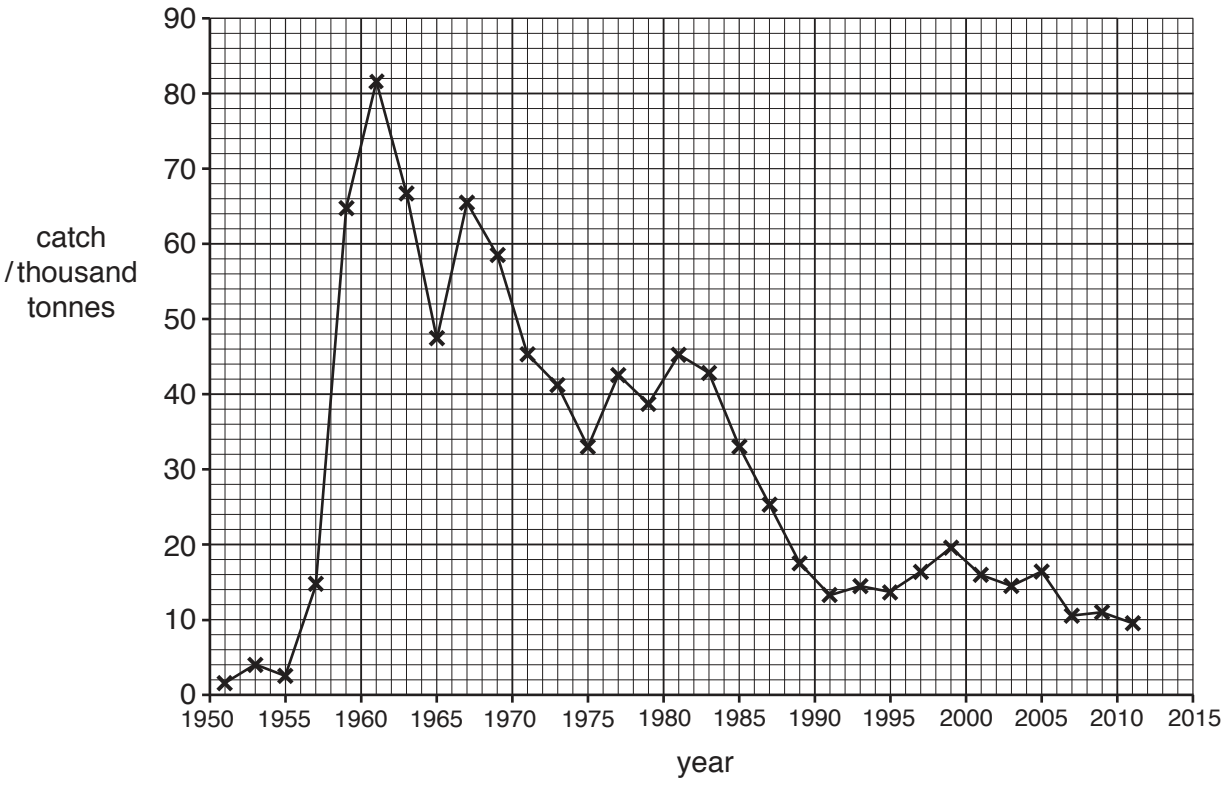


Fig. 1.1

(a) State the year of maximum catch for southern bluefin tuna.

.....
[1]

(b) Use Fig. 1.1 to describe the changes in catch of southern bluefin tuna between 1980 and 2011.

.....

.....

.....

.....

.....

..... [3]

(c) Calculate the percentage change in catch from 1967 to 1991.

Show your working.

.....
[2]

(d) Humans are the main predators of southern bluefin tuna.

Suggest **and** explain how the population of southern bluefin tuna could be affected by the change in catch between 1967 and 1991.

.....

..... [1]

[Total: 7]

[Turn over

2 Divers carried out a survey to test the following hypothesis:

Each species of coral has an optimum depth where they are found in higher numbers.

Table 2.1 shows the results of the survey.

Table 2.1

depth/m	number of coral colonies					
	species A	species B	species C	species D	species E	species F
2	67	54	1	0	17	15
4	4	6	0	3	22	13
12	0	0	21	28	18	14

(a) (i) Describe a method the divers could have used to collect reliable data.

.....

.....

.....

.....

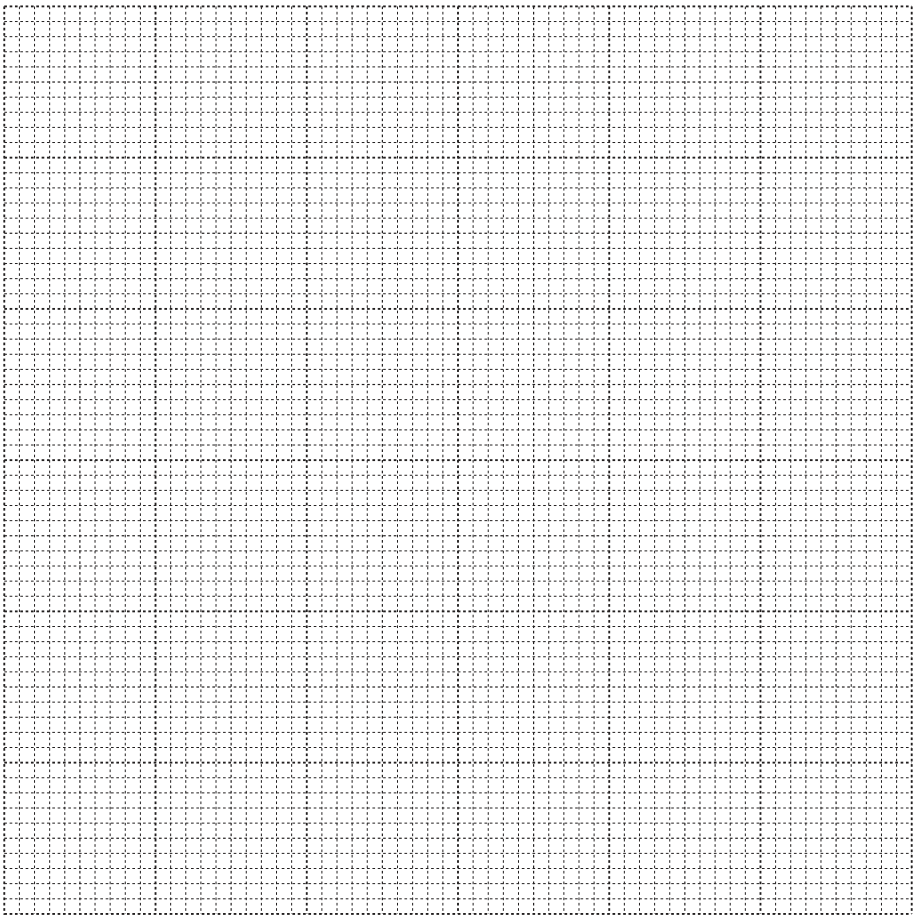
.....

.....

.....

..... [4]

(ii) Draw a bar chart using the data in Table 2.1, to show the number of colonies of each species of coral found at a depth of **4 m**.



[4]

(iii) Use the data in Table 2.1 to compare the depth preferences of the six species of coral.

.....

.....

.....

.....

.....

..... [3]

(b) Discuss the extent to which the data in Table 2.1 support the hypothesis.

.....

.....

.....

..... [2]

[Total: 13]

Section B

Answer **both** questions in this section.

3 **(a)** Mutualism and parasitism are two examples of interrelationships between species.

Describe each of these types of interrelationships, with reference to specific marine examples.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [8]

(b) **(i)** Coral reefs are areas with high productivity.

Explain the meaning of the term *productivity*.

.....

.....

.....

..... [2]

(ii) Suggest reasons why coral reefs have a high productivity.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

[Total: 15]

4 **(a)** **(i)** Explain how the alignment of the Sun and the Moon affects the tidal range. You may use diagrams in your answer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

(ii) Describe other factors that can affect tidal range.

.....

.....

.....

.....

.....

..... [3]

(b) Outline how environmental factors affect the formation of communities on a rocky shore.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 15]

BLANK PAGE

BLANK PAGE

BLANK PAGE