Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

8691454978

MARINE SCIENCE **5180/03**

Paper 3 Practical Assessment Paper **May/June 2022**

1 hour 30 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- 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.
- Write your answer to each question in the space provided.
- 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.

INFORMATION

- The total mark for this paper is 60.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages. Any blank pages are indicated.

1 Fig. 1.1 shows a species of flat fish.

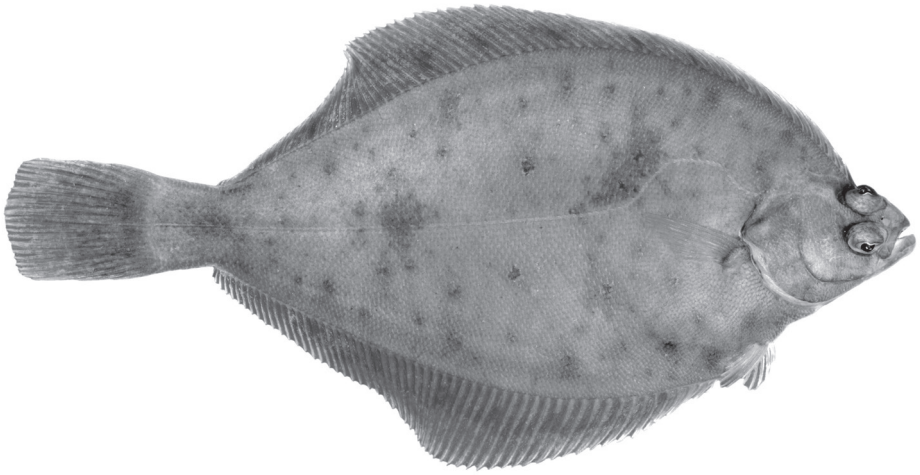


Fig. 1.1

(a) Make a large drawing of the specimen shown in Fig. 1.1.

Do **not** show all the markings.

[4]

(b) (i) On your diagram label the following features:

- the operculum
- the lateral line
- a named median fin.

[3]

(ii) The actual total length of the fish is 23 cm.

Add a scale line to your drawing. [1]

(iii) Use the information in **1(b)(ii)** and the formula provided to calculate the magnification of the fish in Fig. 1.1.

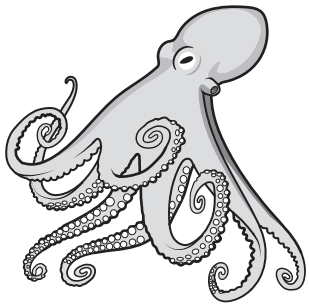
$$magnification = \frac{image\ length}{actual\ length}$$

Space for working.

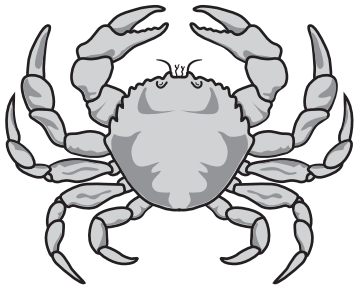
..... [3]

[Total: 11]

2 **(a)** Fig. 2.1 shows two species of invertebrate, **A** and **B**.



A



B

not to scale

Fig. 2.1

(i) State the phylum that each species belongs to.

A .....

B .....

[2]

(ii) Using Fig. 2.1, complete Table 2.1 to show similarities and differences between the two species.

Table 2.1

feature	species A	species B
number of limbs	.....	.....
type of limbs	.....	.....
position of eyes	.....	.....
antennae	.....	.....

[4]

(b) A student investigates how tide height varies over a 24-hour period at one location.

Fig. 2.2 shows the graph from the data collected.

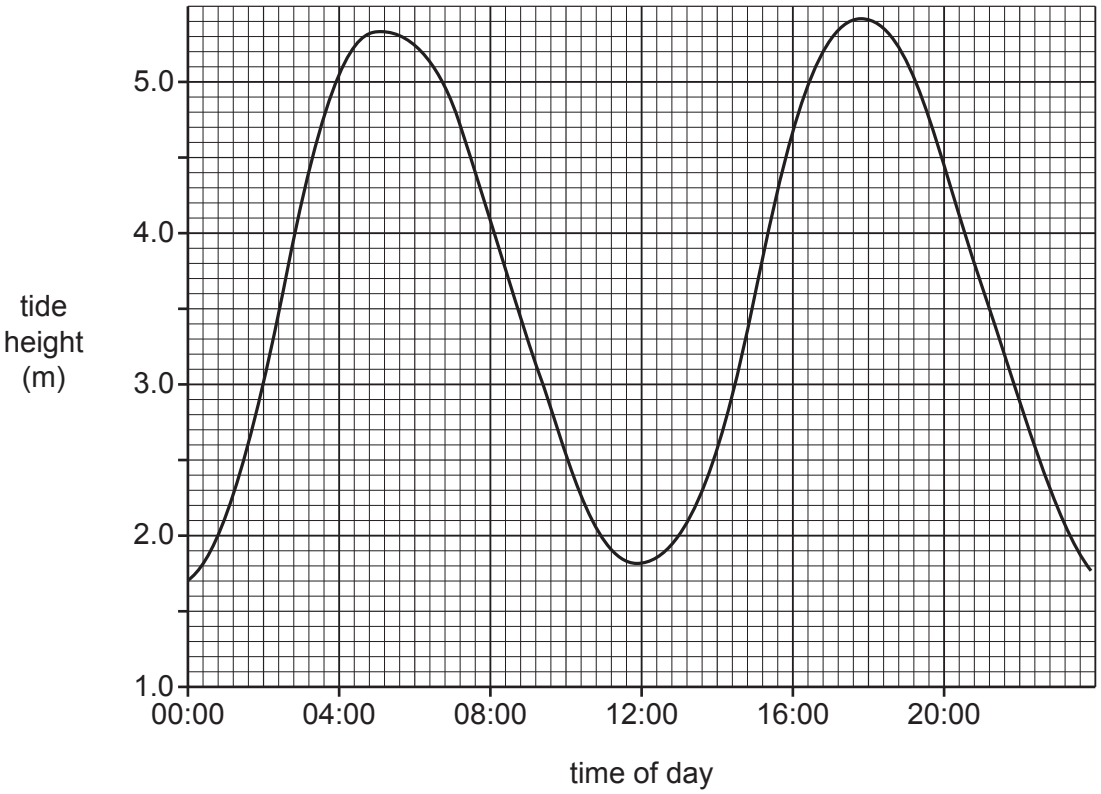


Fig. 2.2

Use Fig. 2.2 to

(i) state the time of the first high tide of the day ..... [1]

(ii) state the height of the tide at 14:00 ..... m [1]

(iii) calculate the time between a high tide and the next low tide.

..... [1]

(c) A student takes samples of sea water during the day. The student measures the density of the water samples.

Fig. 2.3 shows the results.

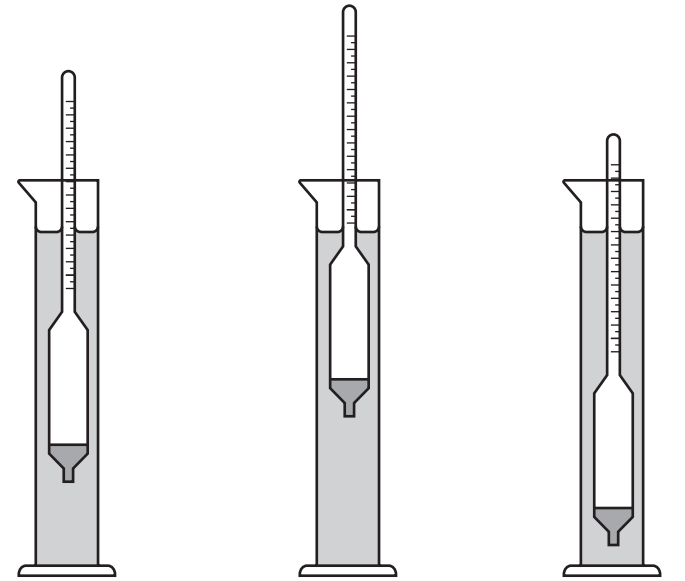


Fig. 2.3

(i) Name the piece of equipment placed into the water that is used to measure density.

..... [1]

(ii) Order the samples in Fig. 2.3 from least dense to most dense.

least dense .....

.....

most dense .....

[1]

[Total: 11]

3 A student compares the density of the shells of three different species of marine mollusc from a rocky shore.

They collected ten shells for each species from the same beach area.

(a) Describe a method to find the mean shell density for each species.

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..... [4]

(b) The student notes that the shells of each species are a different shape.

Describe a method they could use to investigate which shell shape is the most streamlined.

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..... [4]

[Total: 8]

4 A student investigated the relationship between the length and mass of mussel shells.

They randomly selected five shells from an exposed rocky shore.

Fig. 4.1 shows a page from their notebook where they recorded their results.

Fig. 4.1

(a) (i) Use the information in Fig. 4.1 to complete Table 4.1 by ranking the data from shortest to longest shell.

Include headings for each column.

Table 4.1

[3]

(ii) The mean length of the five mussel shells is 64 mm.

Calculate the mean mass of the mussel shells.

Show your working.

mean mass ..... g [2]

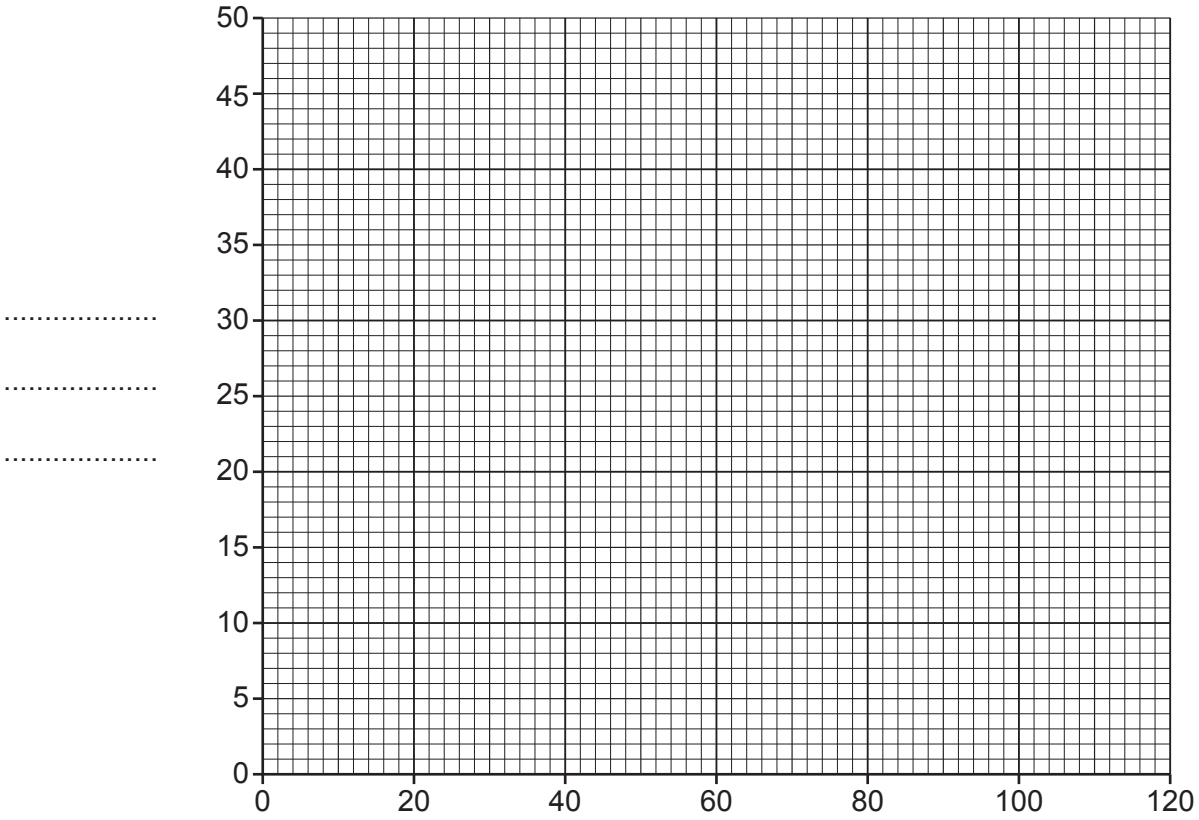
(iii) Calculate the simplest ratio for shell length : shell mass.

..... [1]

(b) (i) Use the information in Table 4.1 to complete the graph in Fig. 4.2 by plotting length against mass of mussel shells.

Draw a line of best fit through the data points.

Include labels for the axes.



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[3]

Fig. 4.2

(ii) Use your graph to estimate the mass of shell that has a length of 90 mm.

..... [1]

(iii) State the relationship between length and mass of the mussel shells.

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..... [1]

[Total: 11]

5 A student notices that the distribution of barnacle species varies with the distance from the low tide level on a rocky shore.

The student forms the following hypothesis.

As the distance from the low tide level increases up a rocky shore, the number of all barnacle species decreases.

(a) Design and describe an investigation which you could carry out to test this hypothesis.

Use the headings given to structure your answer.

- Method, including all the equipment needed and a safety precaution.
- Presentation and analysis of the results.

Method, including all the equipment needed and a safety precaution.

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Presentation and analysis of the results.

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[14]

(b) Describe the limitations of your method and suggest improvements.

Suggest further work to extend the investigation.

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..... [5]

[Total: 19]

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