Cambridge O Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MARINE SCIENCE **5180/03**

Paper 3 Practical Assessment Paper **October/November 2020**

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 **16** pages. Blank pages are indicated.

[Turn over

1   Fig. 1.1 is an image of a sohal surgeonfish.
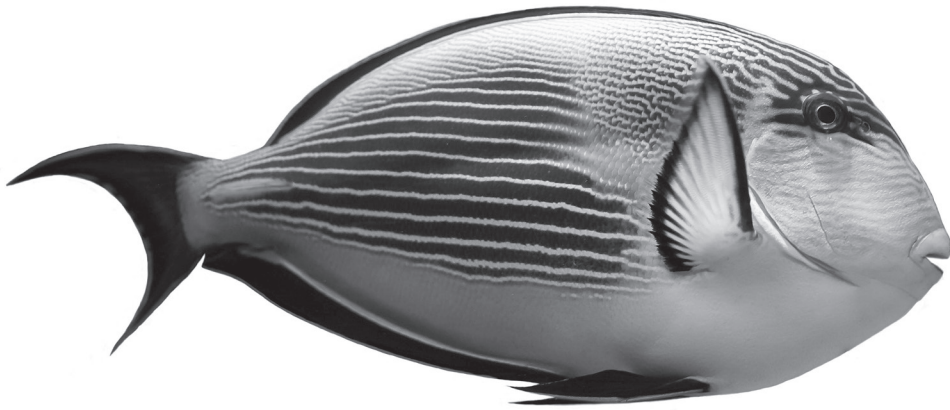
Fig. 1.1

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

Do **not** show the markings.

[4]

(b) On your drawing label each of the following features:

- a median fin (for example the caudal fin)
- a paired fin (for example a pelvic fin)
- the operculum.

[3]

(c) (i) Measure the length of the image of the fish in Fig. 1.1.

image length = ... cm [1]

(ii) The magnification of the image of the fish in Fig. 1.1 is ×0.4.

Calculate the actual length of the fish in Fig. 1.1.

magnification = $\dfrac{\textbf{image length}}{\textbf{actual length}}$

State the unit.

actual length = ...
[2]

(iii) On your drawing of the fish, draw a suitable scale line to show the actual length of the specimen. [1]

[Total: 11]

 [Turn over

2 Fig. 2.1 shows a giant clam and Fig. 2.2 shows a starfish.
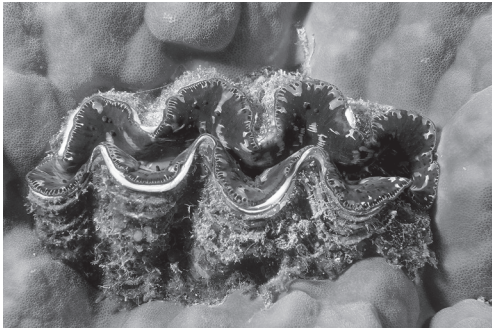
Fig. 2.1
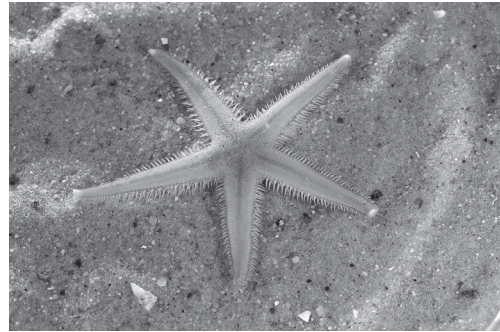
Fig. 2.2

(a) Name the group each species belongs to.

giant clam ....

starfish ....
[2]

(b) Table 2.1 shows some features used to help identify species.

Complete Table 2.1 by:

- placing a tick (✓) in the box if the feature is present for the organism

- placing a cross (✗) in the box if the feature is absent.

Table 2.1

feature	giant clam	starfish
shell		
tube feet		
penta-radial (5-fold) symmetry		
tentacles		

[4]

(c) The giant clam is a filter feeder. To examine what giant clams may be feeding on, a sample of water was taken from their habitat. Fig. 2.3 shows a sample from the water when examined under a microscope.
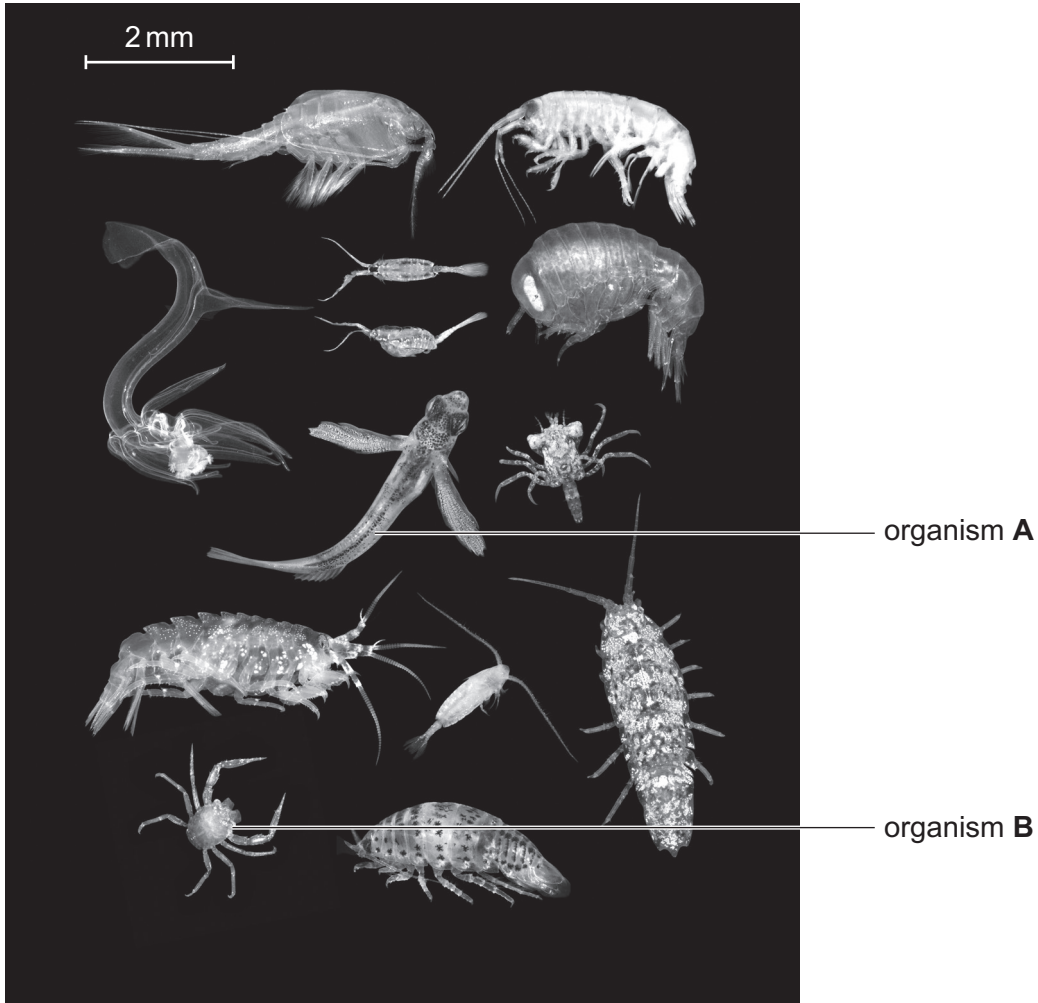
Fig. 2.3

(i) Name the type of organisms shown in the photograph.

.... [1]

(ii) Describe **three** features, visible in Fig. 2.3, that show how organism **A** differs from organism **B**.

1 ....

2 ....

3 ....
[3]

[Total: 10]

3 (a) Fig. 3.1 shows a mussel. Fig. 3.2 shows a population of mussels.

Fig. 3.1   **Fig. 3.2**

A class of students wanted to find the mean volume of mussels living on a rocky shore. They chose ten mussels at random from the shore.

(i) Explain how to select a random sample.

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.... [3]

(ii) Describe how to find the mean volume of ten mussels.

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.... [5]

(b) The class of students investigated the number of organisms at each trophic level in this community.

Their data is shown in Table 3.1.

Table 3.1

organism	trophic level	number of organisms
phytoplankton	1	12 700
zooplankton	2	6 530
mussels	3	63
shore crabs	4	1

(i) In the space below, draw a pyramid of numbers to represent the data shown in Table 3.1.

[3]

(ii) Suggest why it would be difficult for the class of students to count the exact number of phytoplankton and zooplankton.

....

.... [1]

[Total: 12]

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4 A tilapia aquaculture operation investigated the growth rate of its fish.

The aquaculture operation collected data on the length and mass of each of seven fish from one pond and recorded the data in a notebook.

(a) Fig. 4.1 and Fig. 4.2 show the last fish being measured.

14 15 16 17
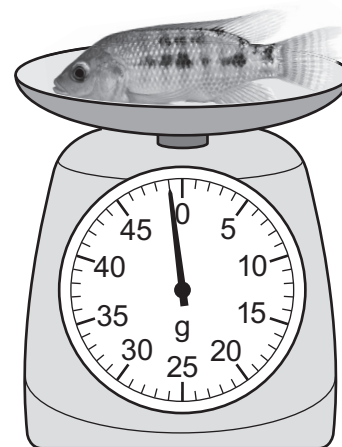
Fig. 4.1

Fig. 4.2

Use Fig. 4.1 to measure the length of this fish.

Use Fig. 4.2 to measure the mass of this fish.

Write both measurements in Fig. 4.3.

Fish 1 length = 12.2 cm   mass = 36g
Fish 2 length = 15.6 cm   mass = 61g
Fish 3 length = 14.1 cm   mass = 52g
Fish 4 length = 13.9 cm   mass = 49g
Fish 5 length = 14.8 cm   mass = 58g
Fish 6 length = 14.3 cm   mass = 52g
Fish 7 length = _____ cm   mass = _____ g

Fig. 4.3

[2]

(b) Draw a table of results for the data shown in Fig. 4.3, including fish 7.

In your table rank by **fish length** from smallest to largest.

[4]

(c) The tilapia aquaculture operation had 10 ponds of fish.

Fig. 4.4 shows the relationship between mean length and mean mass for fish in each of the tilapia ponds.

Each data point represents the mean length and mean mass of fish in one pond.
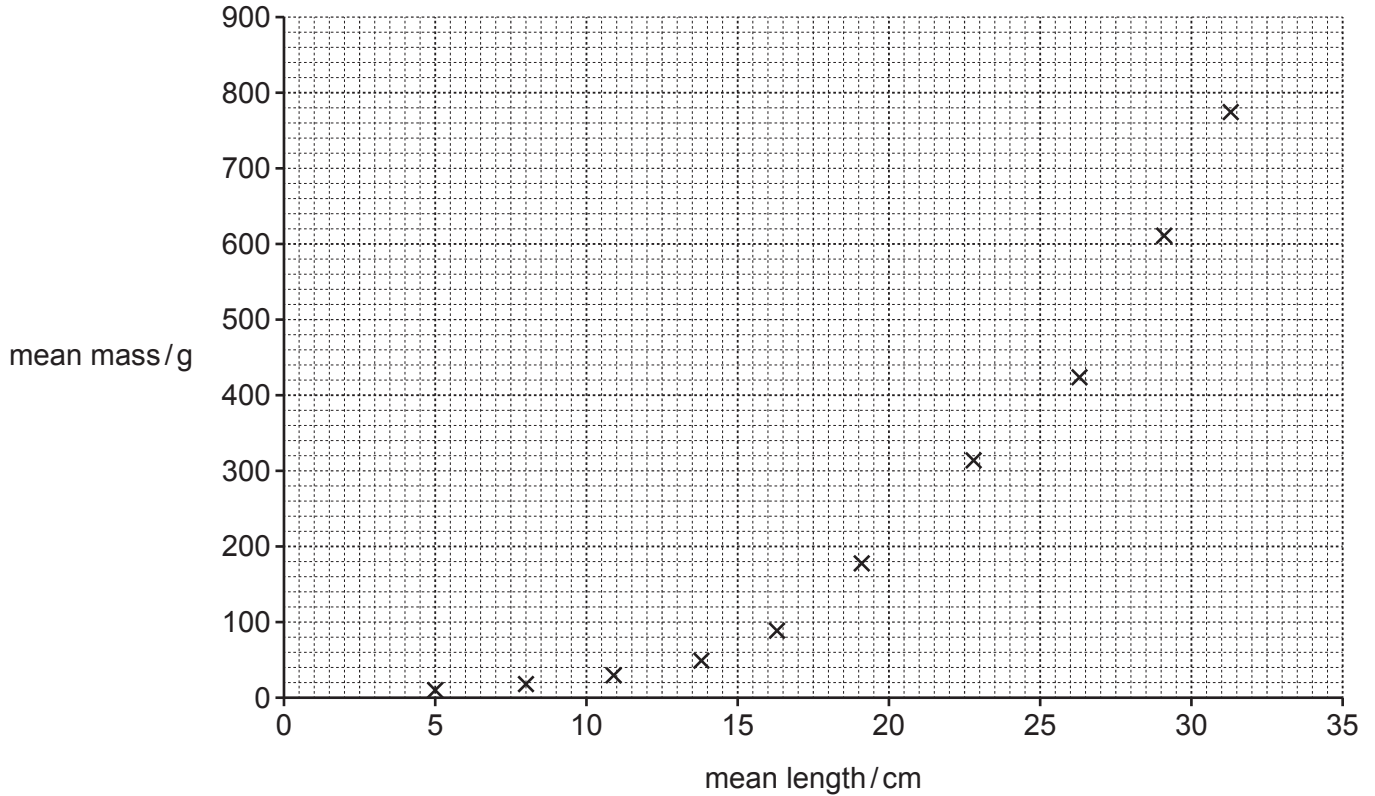
Fig. 4.4

(i) Draw a curve of best fit through the data points in Fig. 4.4. [1]

(ii) Use your curve of best fit to estimate the mass of a fish which has a length of 25 cm.

.... g [1]

(iii) State the relationship between the mean length and mean mass of the fish shown in Fig. 4.4.

....

.... [1]

[Total: 9]

5 A student noticed that around her island there was more seagrass growing where there was a slower current. She decided to investigate this.

The student formed the following hypothesis.

Areas with slower current speed have more seagrass growing.

(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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[13]

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

Suggest further work to extend the investigation.

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.... [5]

[Total: 18]

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