Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

0123456789

MARINE SCIENCE **0697/02**

Paper 2 Theory and Practical Skills **For examination from 2024**

SPECIMEN PAPER **1 hour 45 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 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **18** pages. Any blank pages are indicated.

1 Fig. 1.1 shows a plaice. Plaice are fish that live on the seabed.

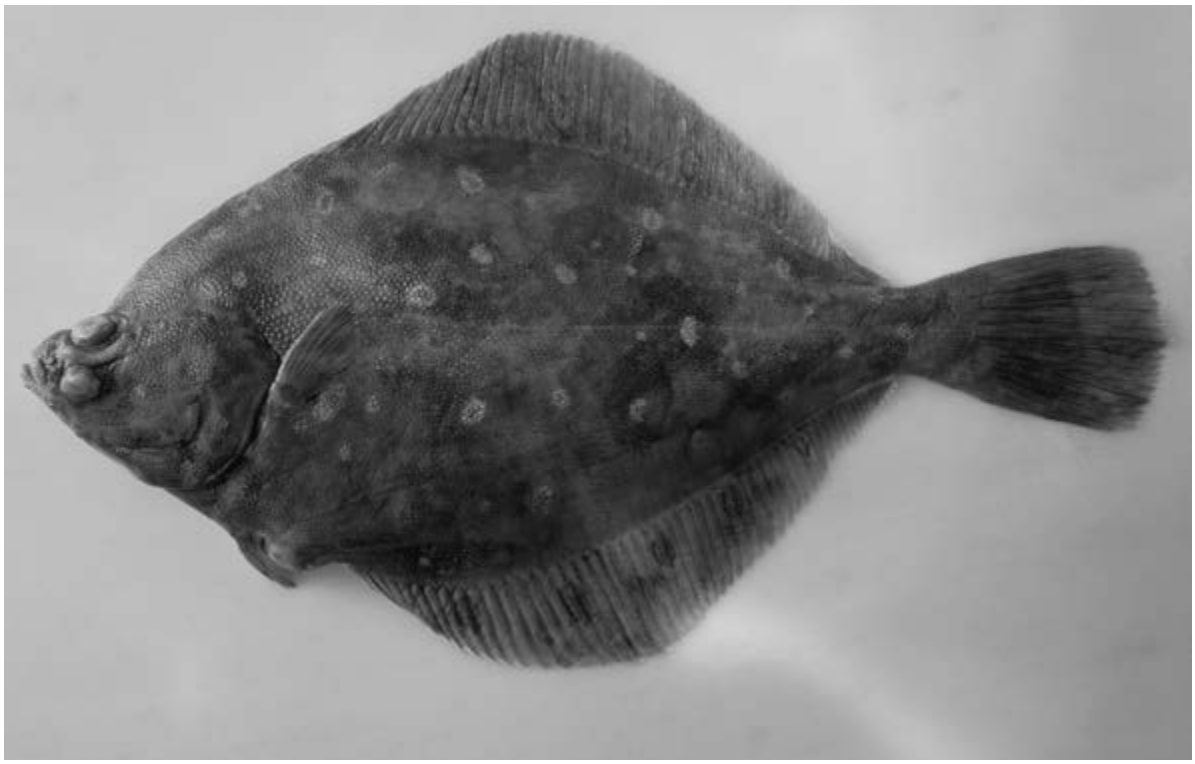

Fig. 1.1

(a) (i) In the space below, make a large, accurate drawing of the plaice.

Do **not** show the markings.

[4]

(ii) On your drawing, label the following features.

- operculum
- caudal fin [2]

(iii) State the function of the lateral line of the plaice.

.....

..... [1]

(b) The actual maximum length of the plaice is 25 cm.

(i) On Fig. 1.1, draw a line to show the maximum length of the plaice in the image.

Measure the length of the line you have drawn.

length = ... [1]

(ii) Use your measurement in **(b)(i)** to calculate the magnification of the image of the plaice in Fig. 1.1.

Show your working.

magnification = ...
[2]

(c) Plaice is a benthic species.

Explain how a plaice is adapted to live in the benthic zone.

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..... [2]

[Total: 12]

2 The run-off of fertiliser from farms into sea water leads to increased growth of photosynthetic algae.

(a) State the **word** equation for photosynthesis.

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..... [1]

(b) Explain how increased growth of marine algae can lead to the death of marine animal species.

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..... [4]

(c) The growth of marine algae can be estimated by measuring the change in maximum depth of light penetration in sea water.

Describe how the maximum depth of light penetration in sea water can be measured.

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..... [4]

[Total: 9]

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3 Commercial seafood producers test food for the presence of the major nutrients.

(a) (i) Describe how to test food for the presence of protein.

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..... [2]

(ii) Describe how to test food for the presence of reducing sugars.

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..... [3]

(b) Shrimps contain a range of nutrients that are needed in the human diet. Table 3.1 shows the masses of some nutrients found in 113 g of shrimp.

Table 3.1

nutrient	mass of nutrient in 113 g of shrimp / g
carbohydrate	1.0
protein	22
fat	2.0
iron	0.0030
calcium	0.050

(i) State **one** major nutrient group that is **not** included in Table 3.1.

..... [1]

(ii) Give **one** function of protein.

.....

..... [1]

(iii) An adult human requires approximately 63 g of protein each day in their diet.

Calculate the mass of shrimp that contains 63 g of protein.

Show your working and state the unit.

mass of shrimp = ...

unit = ...
[3]

(iv) Explain the biological role of iron.

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..... [2]

[Total: 12]

4 Some species of anglerfish are fished commercially.

Scientists investigated if the mean length of anglerfish on sale in fish markets changed over a period of ten years.

Each year during June, they randomly selected 250 fish from markets in a coastal town.

The scientists calculated the mean lengths of the anglerfish.

The results are shown in Table 4.1.

Table 4.1

year	mean length of anglerfish / cm
2005	51
2006	52
2007	50
2008	52
2009	47
2010	45
2011	41
2012	38
2013	40
2014	35

(a) (i) Suggest why the scientists randomly selected the fish on sale in each market.

.....

..... [1]

(ii) The scientists took measurements at the same time each year.

Suggest **two** other variables that the scientists should keep the same in their investigation.

1 .....

2 .....
[2]

(iii) Describe how the mean length of anglerfish changes between 2005 and 2014.

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..... [2]

(iv) Suggest **two** reasons for the change in mean length of anglerfish between 2005 and 2014.

1 .....

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2 .....

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[2]

(b) Deep-sea species of anglerfish live in the midnight zone of oceans.

(i) Describe the conditions in the midnight zone.

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..... [3]

(ii) Explain how deep-sea species of fish are adapted to feed.

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..... [3]

[Total: 13]

5 The rate of photosynthesis in an aquatic plant can be estimated by counting the number of bubbles produced in one minute.

Fig. 5.1 shows the equipment for this investigation.

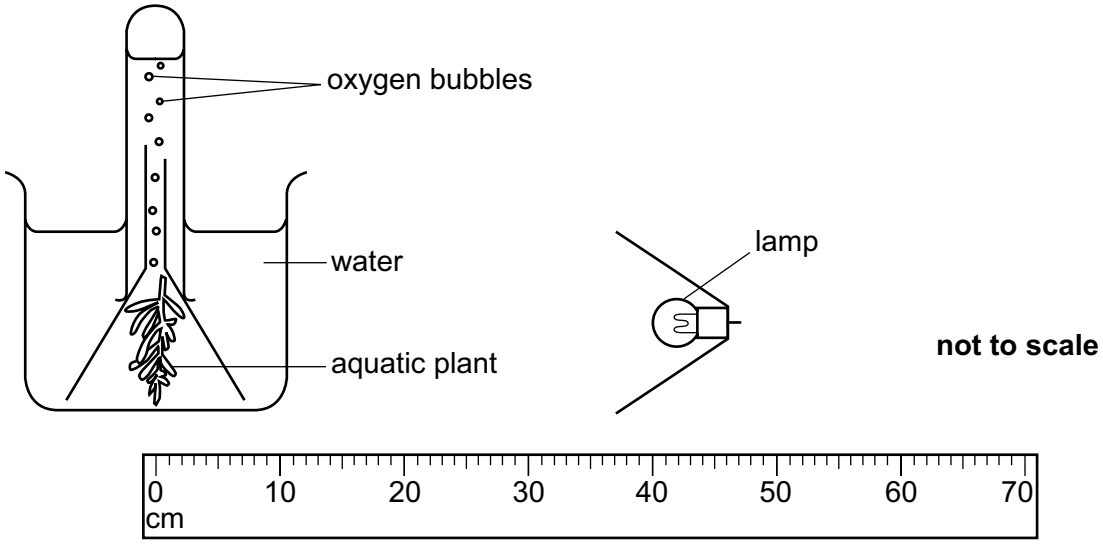


Fig. 5.1

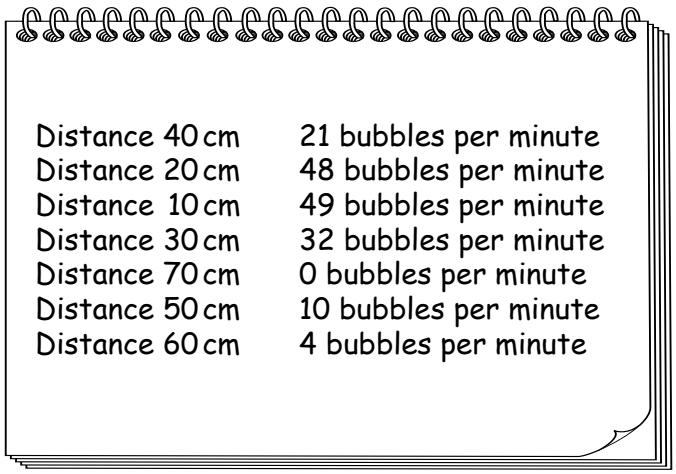
A student investigates the effect of changing the distance of a lamp from the plant on the rate of photosynthesis.

The student places the lamp 40 cm from the aquatic plant, as shown in Fig. 5.1.

She records the number of bubbles produced in one minute.

She repeats this process with the lamp at different distances from the aquatic plant.

The student's results are shown in Fig. 5.2.



Distance 40 cm	21 bubbles per minute
Distance 20 cm	48 bubbles per minute
Distance 10 cm	49 bubbles per minute
Distance 30 cm	32 bubbles per minute
Distance 70 cm	0 bubbles per minute
Distance 50 cm	10 bubbles per minute
Distance 60 cm	4 bubbles per minute

Fig. 5.2

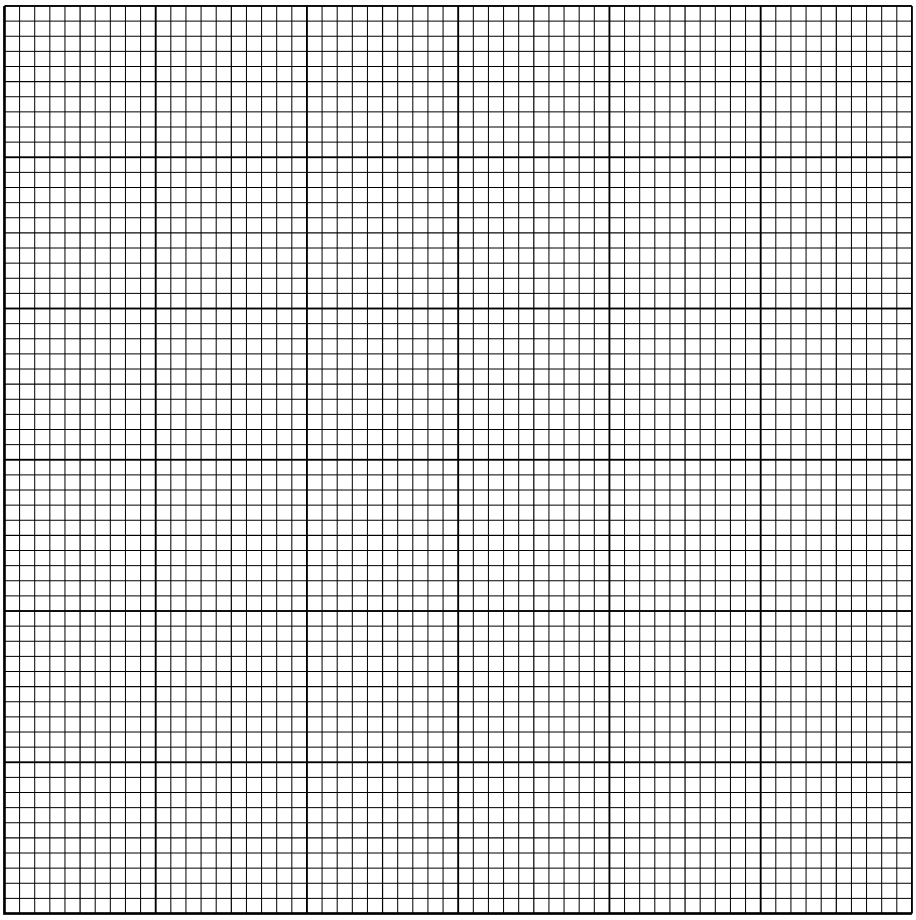
(a) Draw a suitable results table for the results shown in Fig. 5.2.

In your table, write the results in order from lowest to highest distances of the lamp.

[3]

(b) Draw a line graph to show the effect of distance of the lamp from the plant on the number of bubbles produced in one minute.

Join your points with ruled, straight lines.



[4]

(c) Describe **and** explain the effect of increasing the distance of the lamp from the plant on the number of bubbles produced in one minute.

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..... [3]

(d) Explain **two** ways the student could improve the investigation.

1 .....

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2 .....

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[4]

[Total: 14]

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6 Scientists suggest that kelp aquaculture helps to reduce global warming.

Fig. 6.1 shows a method that can be used for kelp aquaculture.

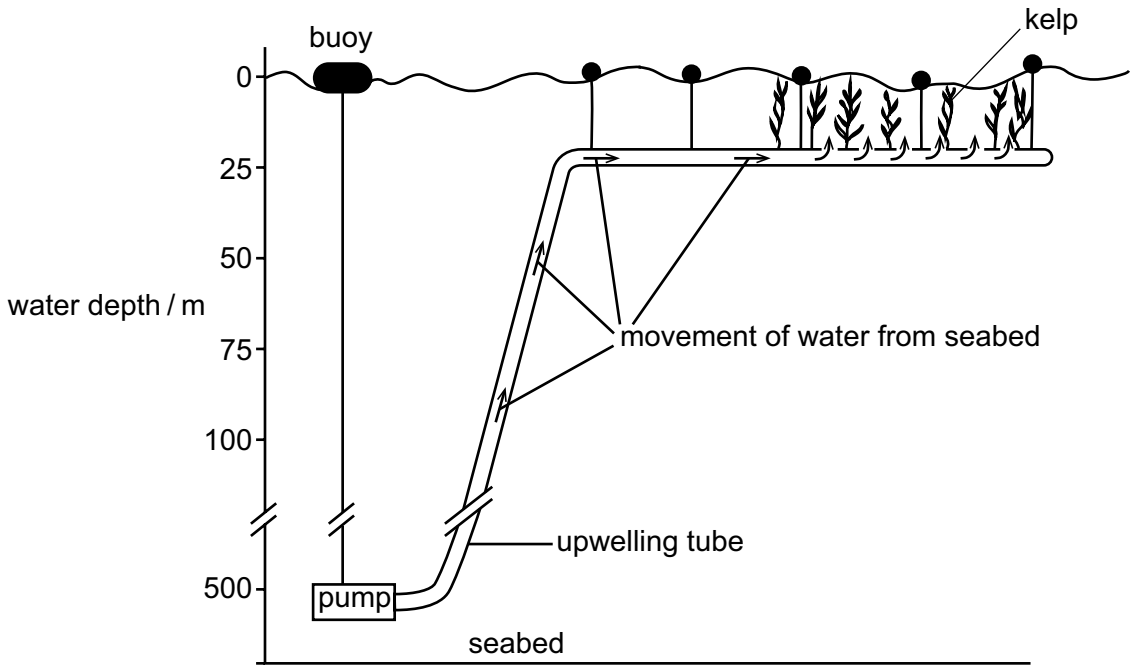

Fig. 6.1

The upwelling tube carries water from the seabed to the area where the kelp is grown.

The pump uses electricity generated by wave power.

(a) Give **one** advantage and **one** disadvantage of using wave power to generate electricity compared to using fossil fuel.

advantage .....

.....

disadvantage .....

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[2]

(b) Suggest why water is pumped up from the seabed to the kelp.

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..... [3]

(c) **(i)** Explain why scientists suggest that large-scale aquaculture of kelp helps to reduce global warming.

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(ii) Suggest **and** explain how large-scale aquaculture of kelp could benefit the environment, other than reducing global warming.

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[Total: 10]

7 Tides affect the distribution of organisms on shores.

(a) Fig. 7.1 shows the relative positions of the Sun and Earth.

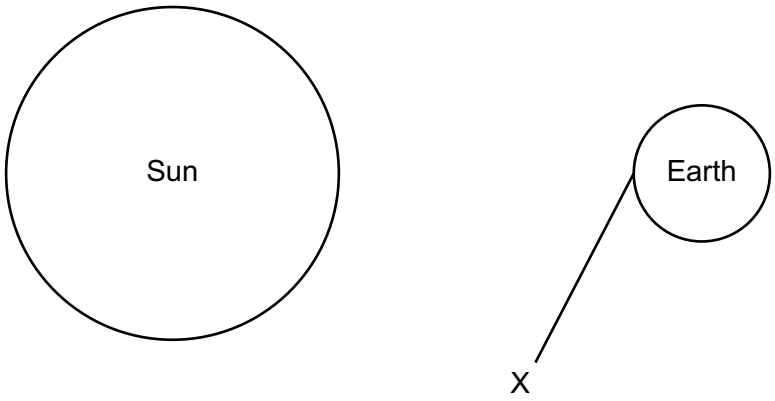

Fig. 7.1

(i) On Fig. 7.1 draw the position of the Moon when there is a spring high tide at the point labelled X. [1]

(ii) Outline how the positions of the Sun and Earth produce spring high tides that are higher than neap high tides.

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..... [3]

(b) Fig. 7.2 shows ghost crab burrows on a beach.

Fig. 7.2

Describe an investigation which you could safely carry out to test whether the number of ghost crab burrows on a beach changes between July and January.

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..... [6]

[Total: 10]

