Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

0747456934

MARINE SCIENCE **0697/01**

Paper 1 Structured **May/June 2023**

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 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages. Any blank pages are indicated.

DC (CE/JG) 327317

[Turn over

Answer **all** questions.

1 **(a)** Complete the sentences using words from the box.

autolysis	carbohydrates	carbon dioxide	fertilisation	hydrogen	lipids
oxygen	protein	putrefaction	rancidity	rigor mortis	

Soon after being caught, fish start to spoil.

..... happens when the muscles start to stiffen.

Fish can also spoil due to bacteria in the fish causing ..... .

Enzymes in the fish start to cause ..... .

Rancidity occurs when the ..... in the fish react with

..... in the air.

[5]

(b) **(i)** Many fisheries products are exported to other countries.

List **three** factors that affect international trade in fisheries products.

1 .....

2 .....

3 .....

[3]

(ii) Suggest why exported fish are often preserved.

.....

.....

.....

..... [2]

(c) Two methods of preservation are canning and irradiation.

Outline each method of preservation.

(i) canning

.....

.....

.....

.....

.....

.....

.....

..... [4]

(ii) irradiation

.....

.....

.....

.....

..... [3]

[Total: 17]

2 Fig. 2.1 shows eight organisms. They are **not** all drawn to the same scale.

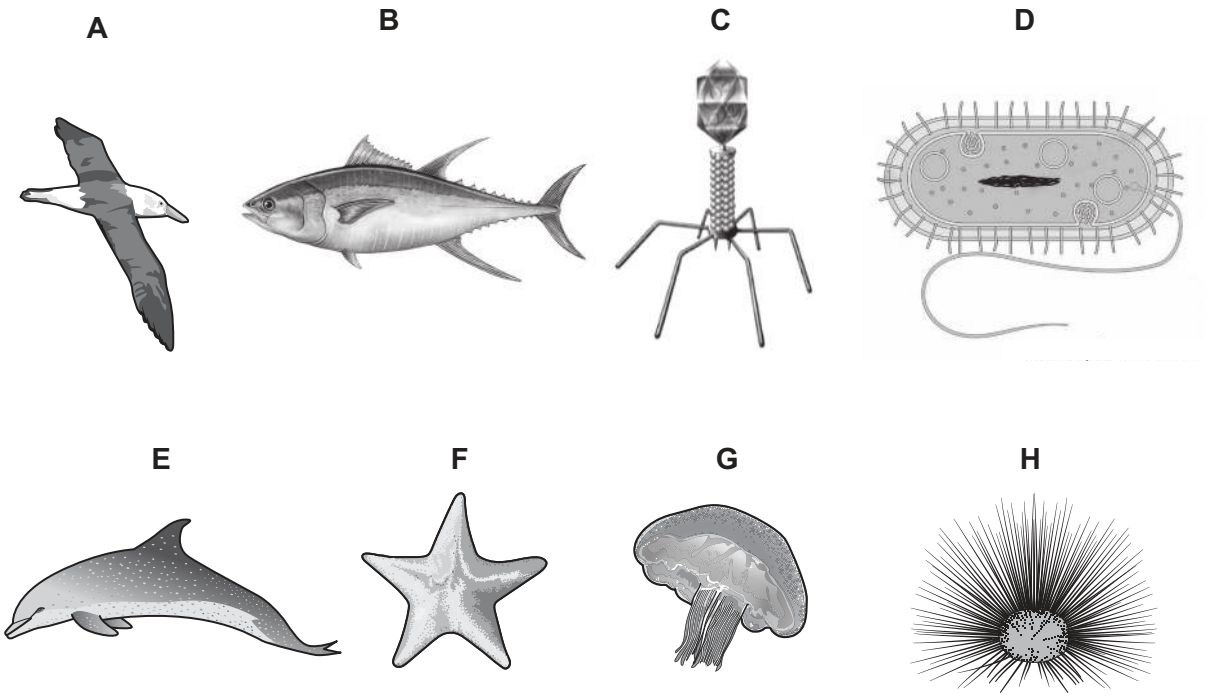

Fig. 2.1

For each feature, complete Table 2.1 by writing the letters of the organisms **A** to **H** from Fig. 2.1 that the feature applies to.
Some rows will contain more than one organism.
Letters may be used once, more than once, or not at all.

Table 2.1

feature	organism(s)
has a flagellum	.....
has a backbone	.....
has tube feet	.....
has a capsid	.....

[4]

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3 **(a)** Fig. 3.1 shows some of the stages in the Darwin-Dana-Daly theory of atoll formation.

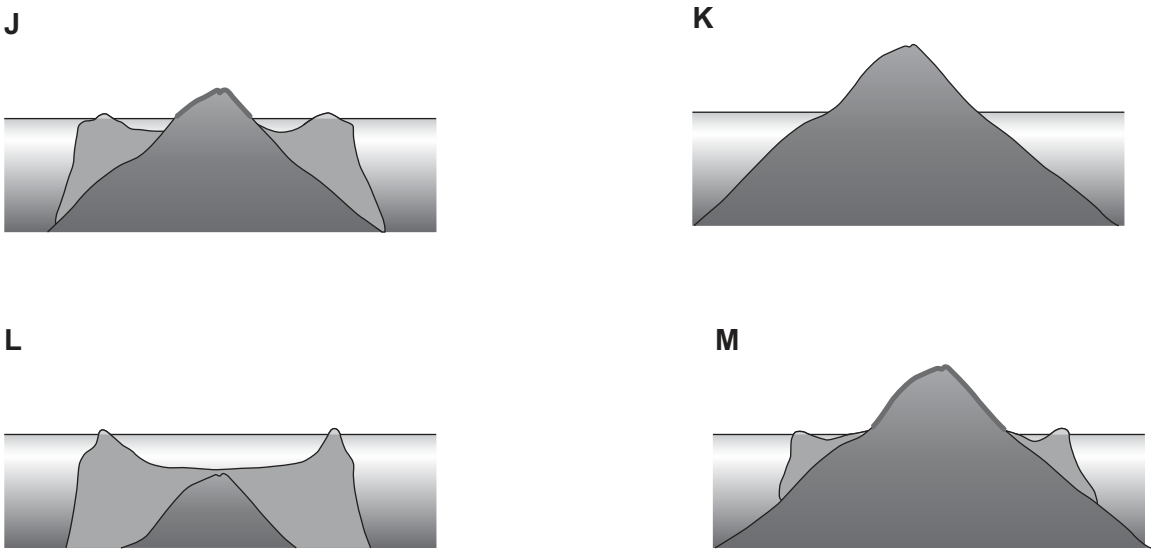


Fig. 3.1

(i) State the letters of the diagrams in the order in which they occur during the formation of an atoll.

..... → ..... → ..... → .....

[2]

(ii) Describe the processes occurring in diagram **M** in Fig. 3.1.

.....

.....

.....

..... [2]

(iii) Describe how the lagoon in **J** is different from the lagoon in **M** in Fig. 3.1.

.....

.....

.....

..... [2]

(b) Discuss the causes of global warming **and** the effects it may have on atolls.

.....

.....

.....

.....

.....

.....

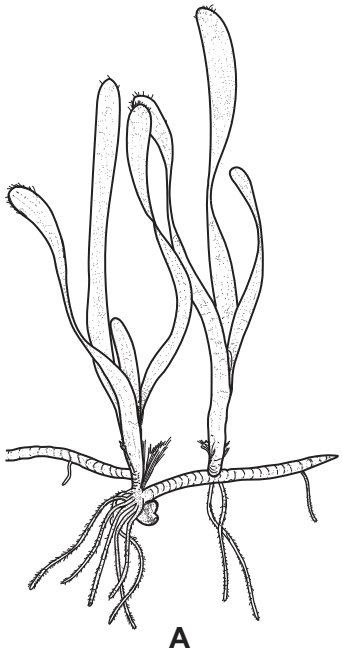
.....

..... [4]

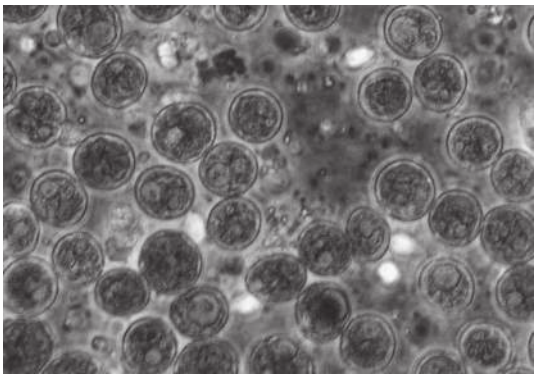
[Total: 10]

4 **(a)** Fig. 4.1 shows two types of photosynthetic organisms.

A is a seagrass plant, *Thalassia testudinum*
B are zooxanthellae, *Symbiodinium microadriaticum*
Images are **not** shown to the same scale.



A



B

Fig. 4.1

(i) Draw a line to identify **and** label a rhizome of the seagrass plant on Fig. 4.1 **A**. [1]

(ii) State the trophic level of these organisms in a food chain.

..... [1]

(b) Table 4.1 shows part of the classification of the seagrass *Thalassia testudinum*.

Complete Table 4.1 for the classification of this seagrass.

Table 4.1

	seagrass
kingdom	.....
.....	magnoliophyta
class	liliopsida
order	hydrocharitales
genus	.....
species	.....

[4]

(c) Name **two** inorganic nutrients required by photosynthetic marine organisms.

..... and ..... [1]

(d) (i) Name a type of organism with which species **B** often has a symbiotic relationship.

..... [1]

(ii) Explain the symbiotic relationship between species **B** and the organism in **(d)(i)**.

.....

.....

.....

.....

.....

..... [3]

(e) Outline the role of decomposers in nutrient recycling of nutrients from species **A**.

.....

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 15]

5 Fish aggregating devices (FADs) are often used by off-shore fisheries to improve commercial catches of tuna.

Scientists investigated the effect on catch of the use of FADs in near-shore fisheries.

(a) Fig. 5.1 shows a locally made near-shore FAD.

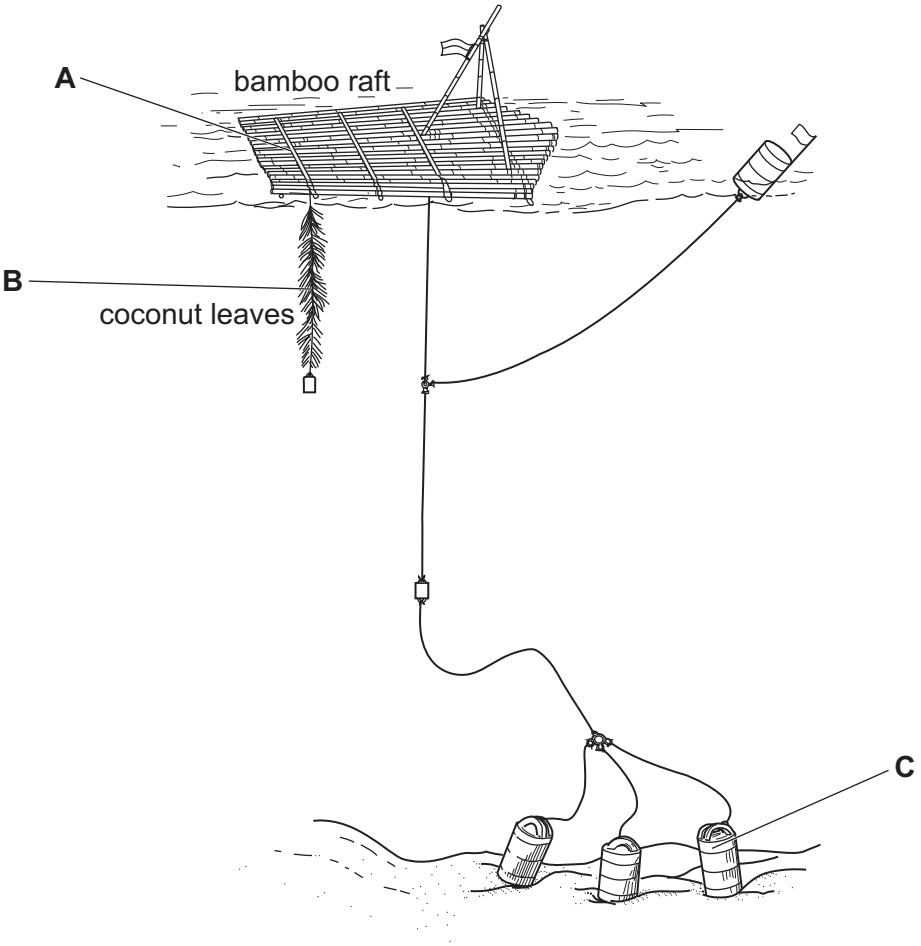


Fig. 5.1

(i) State the function of **A**, **B** and **C**.

A .....

.....

B .....

.....

C .....

.....

[3]

(ii) Describe near-shore fisheries.

.....

..... [1]

(iii) Gill nets are often used to catch fish around FADs.

State **one** environmental problem of using gill nets.

.....

..... [1]

(b) Scientists monitored fishing effort from mangroves and reefs within near-shore fisheries.

They placed FADs 500 m away. The fishing effort was monitored again.

The results are shown in Table 5.1.

Table 5.1

	fishing effort before FAD / total boat hours	**fishing effort after FAD / total boat hours**
FAD	0	100
reefs	100	25
mangroves	100	30

(i) The catch from the mangroves and reefs dropped after the FADs were placed.

Suggest an explanation for the change in fishing effort at the mangroves and reefs after FADs were placed.

.....

.....

.....

..... [2]

(ii) Suggest the long-term benefits of the change in fishing effort in the mangrove and reef habitats.

.....

.....

.....

..... [2]

(c) Table 5.2 shows data on catches and sales of fish caught on three islands.

Table 5.2

	CPUE / kg per fisher hour	total catch / 1000 kg	price for fish sold / $ per kg	percentage of catch sold
island P	2.78	28.4	1.81	37
island Q	0.97	44.3	2.19	69
island R	0.82	72.5	2.80	83

(i) Calculate the income made by island **Q** for selling their fish.

Show your working.

[3]

(ii) Suggest the long-term effect of fishing levels on island **R** compared to island **P**.

.....

.....

.....

.....

.....

..... [3]

(d) A questionnaire was given to fishermen and their families. Some of the positive and negative comments about fishing around an FAD were recorded.

The comments are shown below.

A less time spent with family

B have fish to sell

C better nutrition in the family

D less time spent growing fruit and vegetables

E less time spent travelling to fishing grounds

Use the letters **A**, **B**, **C**, **D** and **E** to sort these comments into Table 5.3 to show the positive and negative impacts. One of these has been done for you.

Table 5.3

positive impact	negative impact
	A

[2]

[Total: 17]

6 Marine pollution is the cause of death for many marine organisms each year.

Fig. 6.1 shows a pie chart of sources of pollutants entering the oceans.

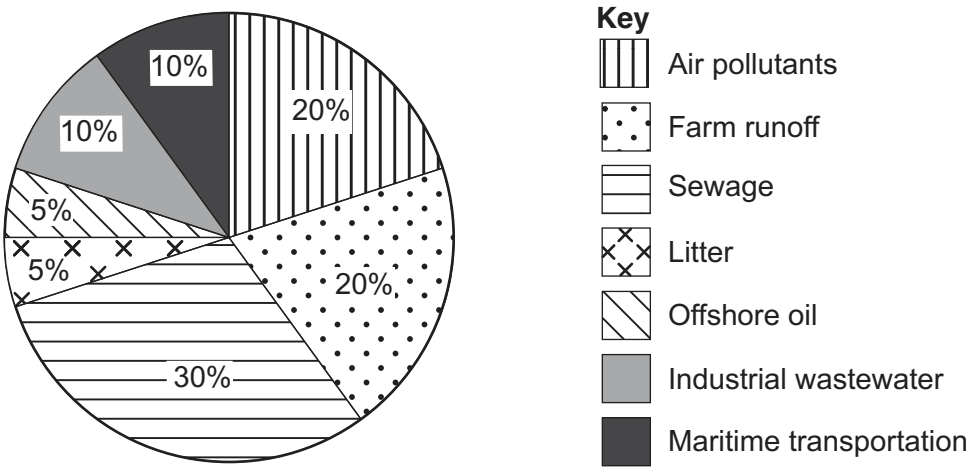


Fig. 6.1

(a) The litter is mainly plastics. Approximately 8 million tonnes of plastic enter the oceans each year.

Calculate the total mass of **all** pollutants entering the oceans each year.

Show your working.

..... million tonnes [2]

(b) Explain the problems caused by sewage pollution.

.....

.....

.....

.....

.....

..... [3]

[Total: 5]

7 **(a)** State **three** factors that can affect the salinity of sea water.

1 .....

2 .....

3 .....

[3]

(b) Fig. 7.1 shows a marine fish.

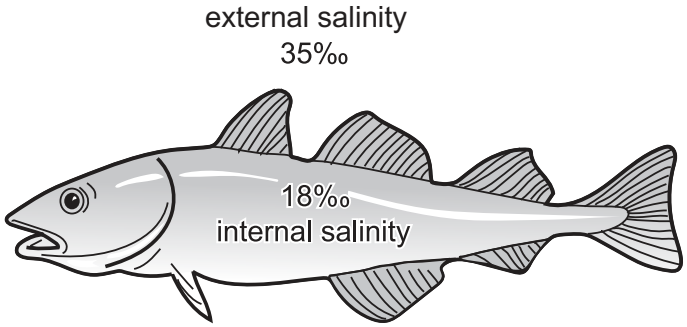


Fig. 7.1

Marine fish constantly drink water.

Use the idea of osmosis to suggest why marine fish need to drink constantly.

.....

.....

.....

.....

.....

..... [3]

[Total: 6]

8 Table 8.1 shows the mass of fish and seafood products eaten per person per year in 1961 and 2017 for some countries.

Table 8.1

country	1961 / kg per person per year	2017 / kg per person per year
France	17.9	34.4
Jamaica	32.6	25.4
India	1.9	6.9
Mauritius	10.9	23.1
Thailand	8.8	29.2

(a) (i) State the name of the country with the lowest consumption in 1961.

..... [1]

(ii) State the name of the country with the greatest increase in consumption per person in kg per year.

..... [1]

(b) (i) State the general trend shown by this data.

.....

..... [1]

(ii) Suggest reasons for the changes in consumption of fish and seafood products between 1961 and 2017.

.....

.....

.....

.....

.....

..... [3]

[Total: 6]