

CANDIDATE
NAME

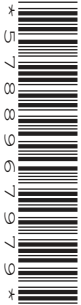
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CENTRE
NUMBER

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MARINE SCIENCE

Paper 1 AS Structured Questions

9693/01

May/June 2015

1 hour 30 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.

Answer **all** questions.

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.

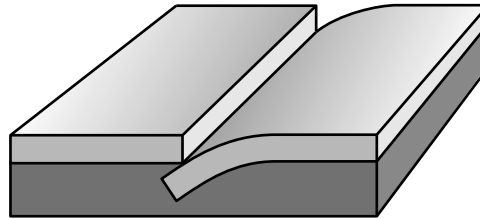
At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

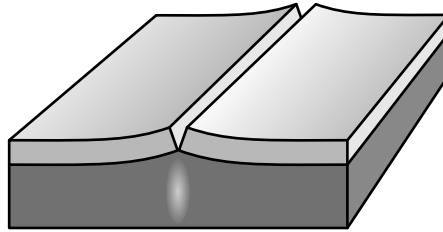
This document consists of **16** printed pages.

Answer **all** the questions in the spaces provided.

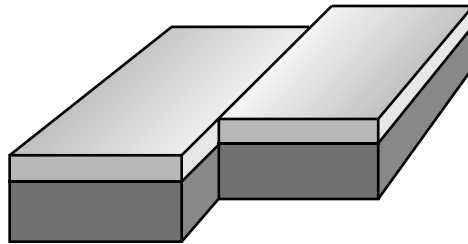
- 1 (a) Fig. 1.1 shows three types of tectonic plate boundary, **A**, **B** and **C**.



A



B



C

Fig. 1.1

- (i) Draw **one** arrow on the surface of each plate to show the movement of the plates at each boundary. [3]

(ii) Name or describe the type of tectonic plate boundary at which the following are formed.

mid-ocean ridges

.....

.....

ocean trenches

.....

.....

volcanoes

.....

.....[3]

(b) Movements at tectonic plate boundaries can create deep cracks in the sea bed.

Explain how hydrothermal vents form in these areas.

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.....[5]

[Total: 11]

- 2 (a) Fig. 2.1 shows the levels of sunlight, the concentration of dissolved nutrients, and the numbers of phytoplankton from February to September in the surface layer of the Mediterranean Sea.

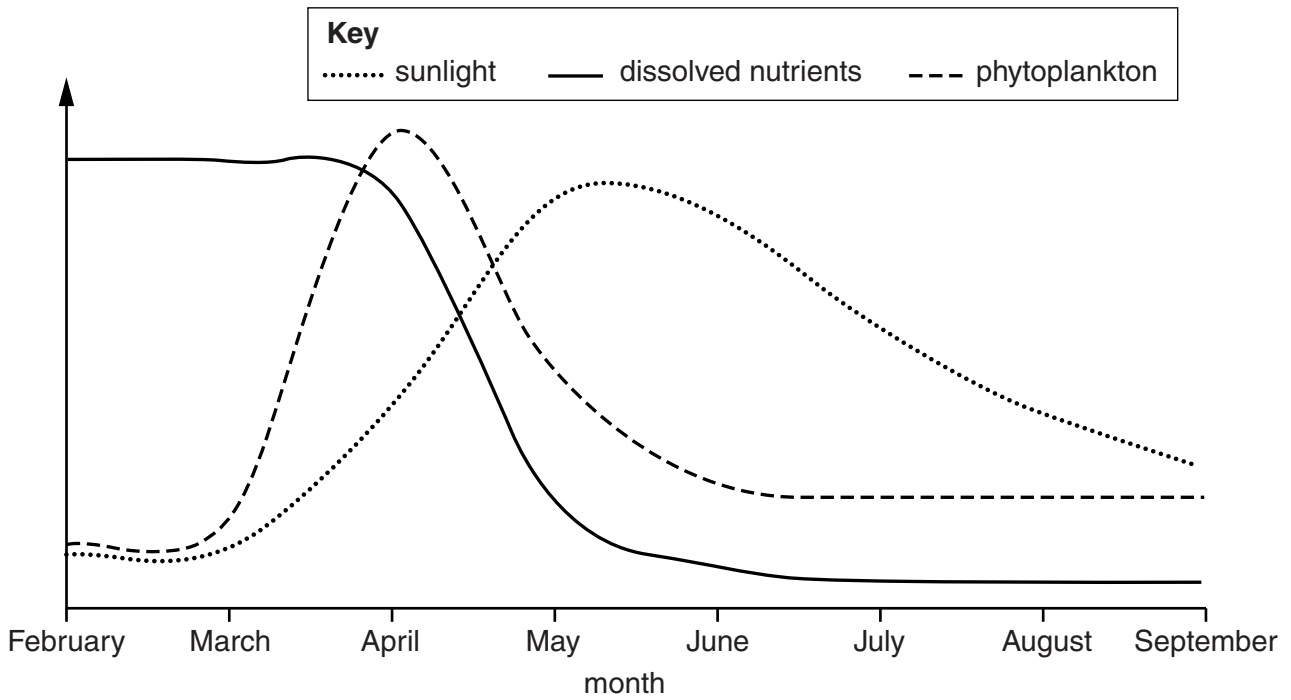


Fig. 2.1

- (i) Suggest explanations for the increase in the numbers of phytoplankton during March and April.

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.....[3]

- (ii) Suggest why the concentration of dissolved nutrients falls during April and May.

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.....[1]

- (iii) Sketch a line on Fig. 2.1 to predict the changes in the numbers of zooplankton from February to September. [3]

(b) Fig. 2.2 shows the energy flow in a marine ecosystem. The numbers are arbitrary units (a.u.)

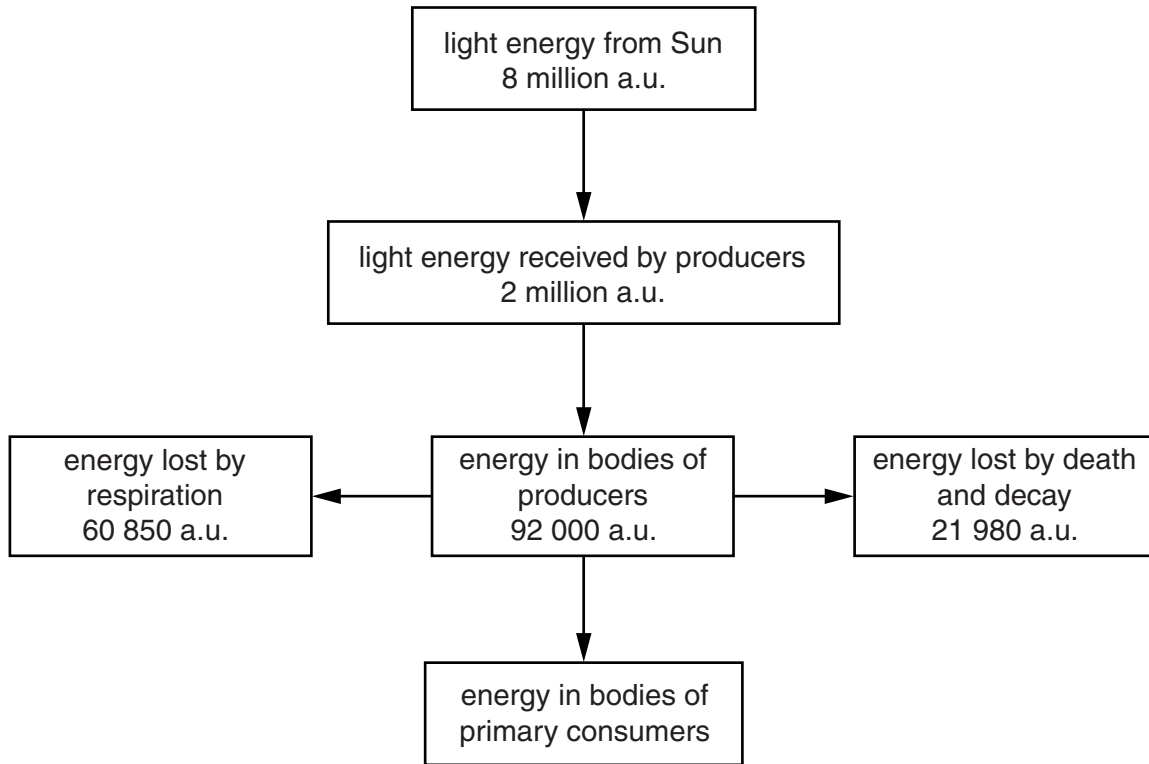


Fig. 2.2

Use the information in Fig. 2.2 to answer the questions below.

- (i) State the number of arbitrary units of energy which are the result of primary productivity.
[1]
- (ii) Calculate the number of arbitrary units of energy transferred to the primary consumers.
[1]
- (iii) Suggest the number of arbitrary units of energy which would pass to the secondary consumers.
[1]
- (iv) State the form in which energy is lost to the environment by respiration.
[1]

(c) Describe the similarities and differences between chemosynthesis and photosynthesis.

similarities

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differences

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.....[4]

[Total: 15]

3 (a) Fig. 3.1 shows some of the feeding relationships in a coral reef food web.

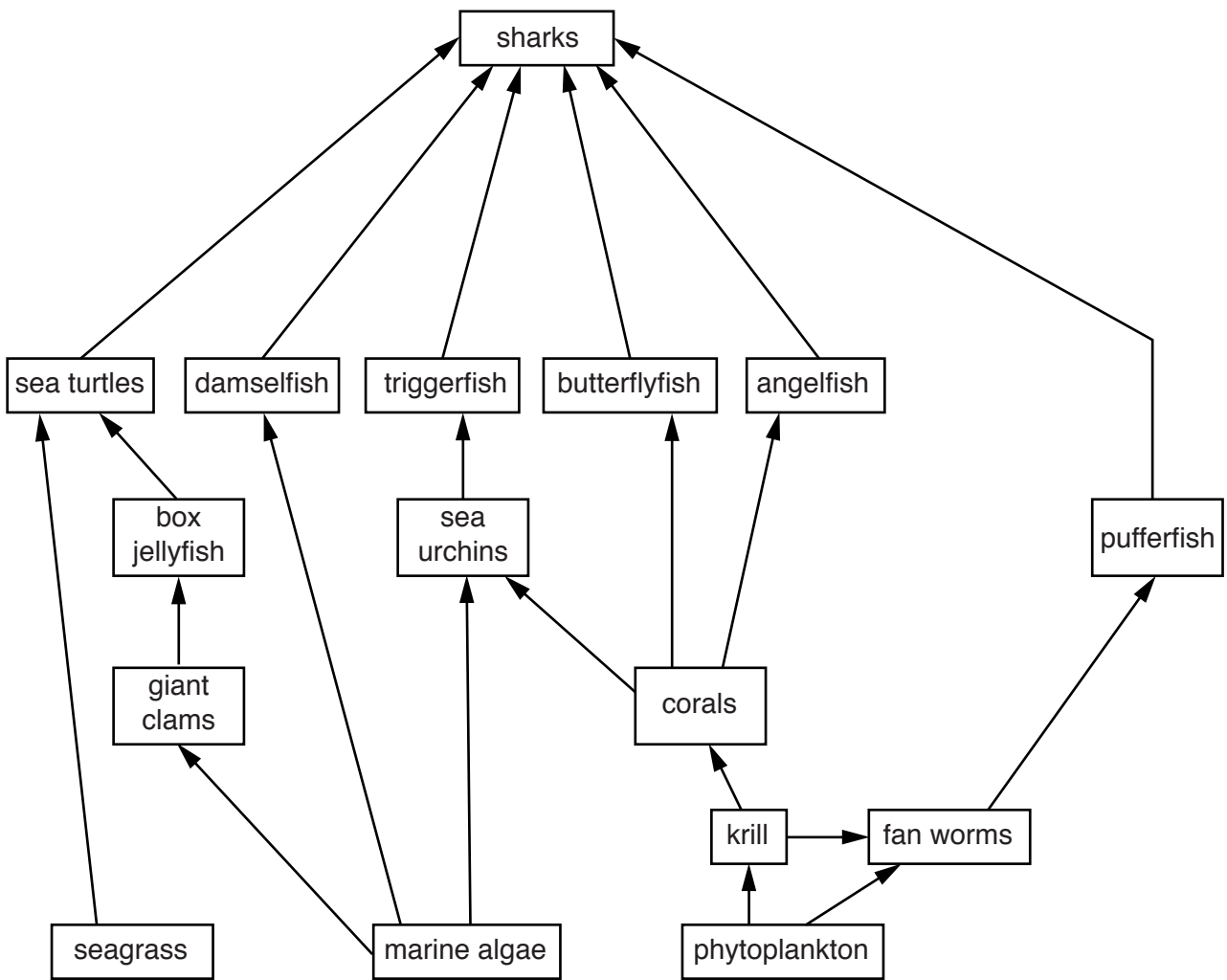


Fig. 3.1

(i) Name the producers in the food web in Fig. 3.1.

.....
[1]

(ii) The crown-of-thorns starfish is a predator of corals and is eaten by triton snails. Add this information to Fig. 3.1. [2]

(iii) Giant clams are harvested by humans for food and are now an endangered species.

Suggest and explain a possible effect on the population of sea turtles if the giant clams become extinct.

.....

[2]

(iv) Explain why sharks are said to occupy general ecological niches.

.....
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.....
.....[3]

(b) Suggest and explain why tropical corals do not normally live in water at a depth of 60 metres or more.

.....
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.....
.....
.....
.....
.....[3]

[Total: 11]

4 (a) State how fish and corals make use of calcium.

fish
.....
corals
.....[2]

(b) Fig. 4.1 shows how calcium is cycled between the land and the sea.

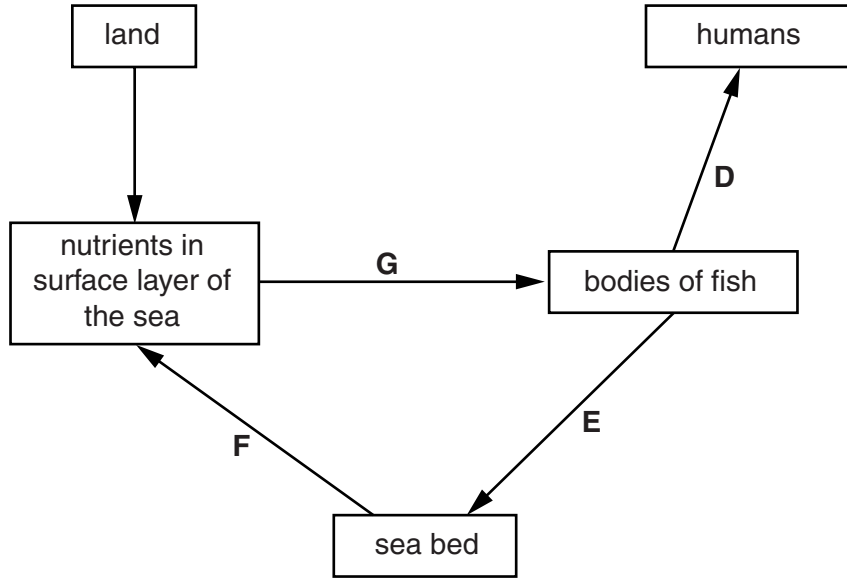


Fig. 4.1

(i) Name processes D, F and G.

D
F
G[3]

(ii) Describe how calcium on land becomes a nutrient in the surface layer of the sea.

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.....
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.....
.....
.....[3]

(iii) Describe process **E**.

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.....[3]

[Total: 11]

5 (a) State **three** possible causes of erosion of coral reefs.

1

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2

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3

.....[3]

(b) Concrete reef balls are often used to make artificial reefs.
Fig. 5.1 shows a reef ball before use.
Fig. 5.2 shows a reef ball after being submerged for 12 months.



Fig. 5.1

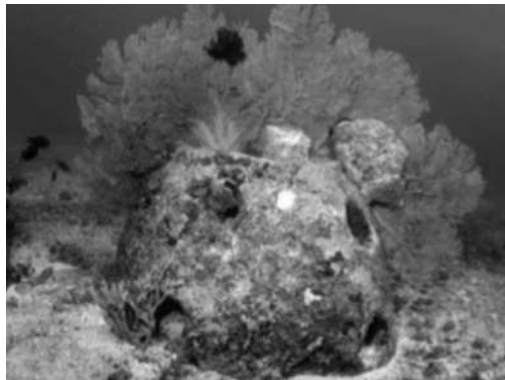


Fig. 5.2

(i) Suggest and explain **two** properties of the reef balls that make them suitable for constructing an artificial reef.

Give a reason for each answer.

1

.....

.....

.....

.....

2

.....

.....

.....[4]

(ii) Explain how the use of artificial reefs can protect sea shores.

.....

[2]

(iii) Suggest **two** disadvantages of the use of artificial reefs.

1

 2
[2]

(c) A test was carried out to find out if the construction of an artificial reef could change the profile of a beach.

The reef was constructed in 1999 and was made up of three rows of reef balls placed 50 metres offshore.

Fig. 5.3 shows the profile of the beach and the sea bed when the reef balls were placed in position in 1999 and two years later in 2001.

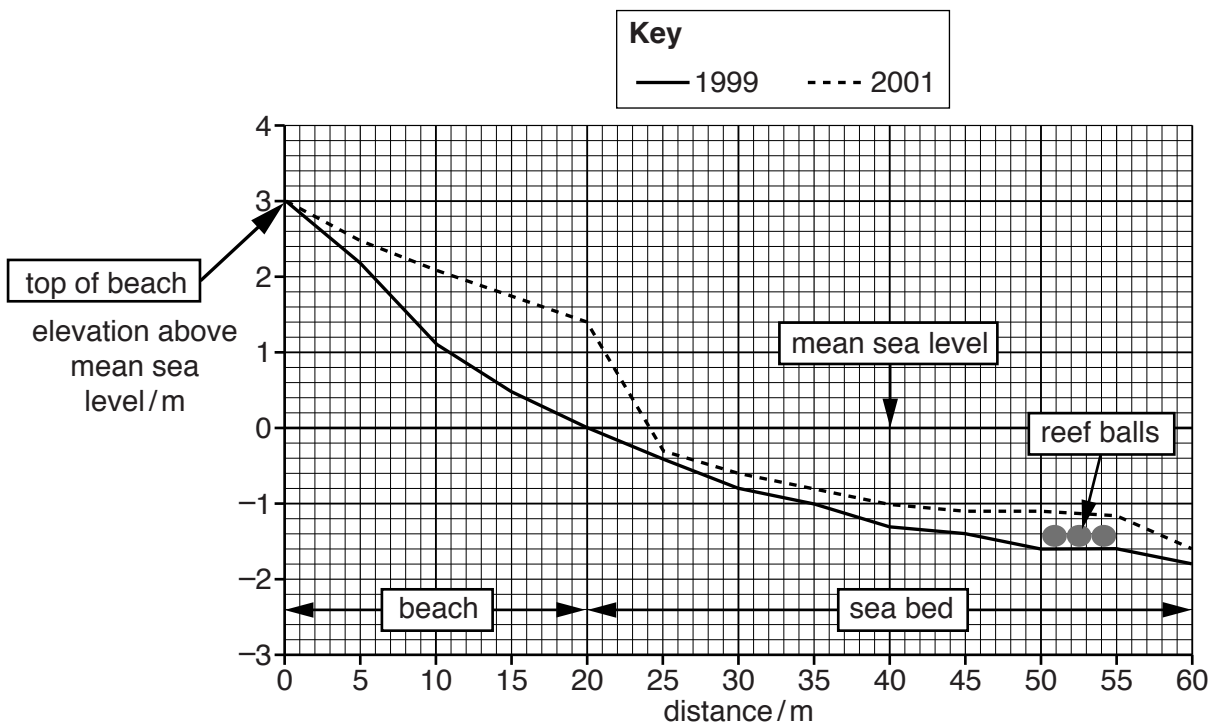


Fig. 5.3

- (i) State the distance from the top of the beach at which the greatest increase in the elevation of the **sea bed** took place between 1999 and 2001.

.....[1]

- (ii) Describe the changes in the profile of the beach and sea bed between 1999 and 2001.

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.....[3]

[Total: 15]

6 (a) Explain how an area of low pressure develops into a tropical cyclone.

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.....[5]

(b) Fig. 6.1 shows an image of a tropical cyclone taken from space.

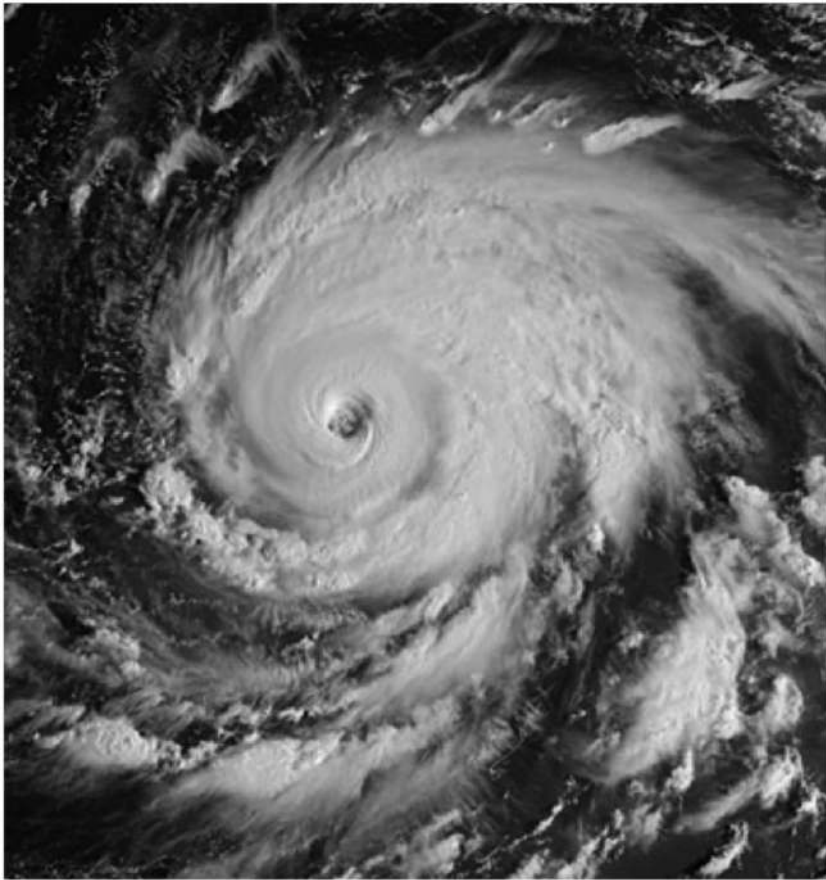


Fig. 6.1

State **two** features of a tropical cyclone visible in Fig. 6.1.

- 1
-
- 2
-[2]

(c) Fig. 6.2 shows the wind speed and air pressure of a number of tropical low pressure systems.

A tropical low pressure system is classified as a tropical cyclone when the wind speed reaches 118 km per hour and the air pressure is 980 millibars or lower.

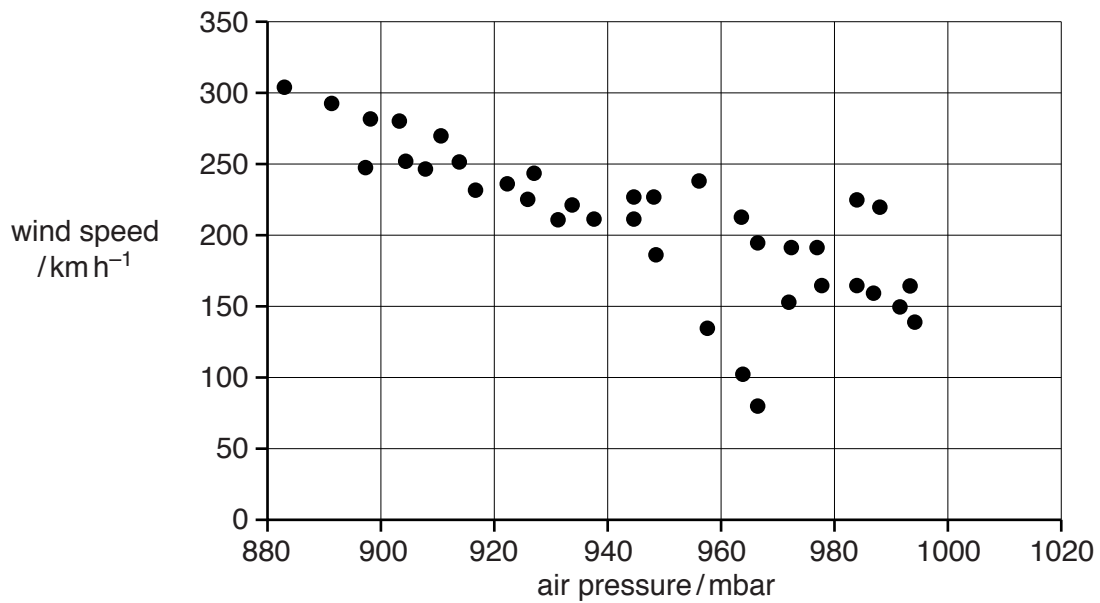


Fig. 6.2

(i) State the relationship between air pressure and wind speed.

-
-[1]

(ii) State the number of tropical cyclones shown on Fig. 6.2.

-[1]

(d) Explain how tropical cyclones may have beneficial effects on human coastal communities.

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[Total: 12]

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