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9693/01

May/June 2012

1 hour 30 minutes

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
Total	

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

the role of an organism within an ecosystem

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graph BT; MA[marine algae] --> L[limpets]; P[phytoplankton] --> Z[zooplankton]; P --> W[worms]; Z --> B[barnacles]; Z --> PR[prawns]; W --> PR; L --> WH[whelks]; B --> BL[blennies]; PR --> BL; WH --> G[gulls]; BL --> G; PR --> G
```

Fig. 1.1

- (i) Explain what is meant by each of the following terms.

a *producer*
..... [1]

a *primary consumer*
..... [1]

- (ii) Name **one** organism in the third trophic level in Fig. 1.1.

..... [1]

- (iii) Suggest what effect a fall in the population of prawns may have on the population of barnacles. Explain your answer.

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

- (iv) Suggest **two** biotic factors, other than by predation that may affect the population of blennies.

1

2 [2]

- 2 Fig. 2.1 shows the energy input to a marine ecosystem from the Sun, the energy within each trophic level and the energy lost from each trophic level. The figures are in arbitrary units.

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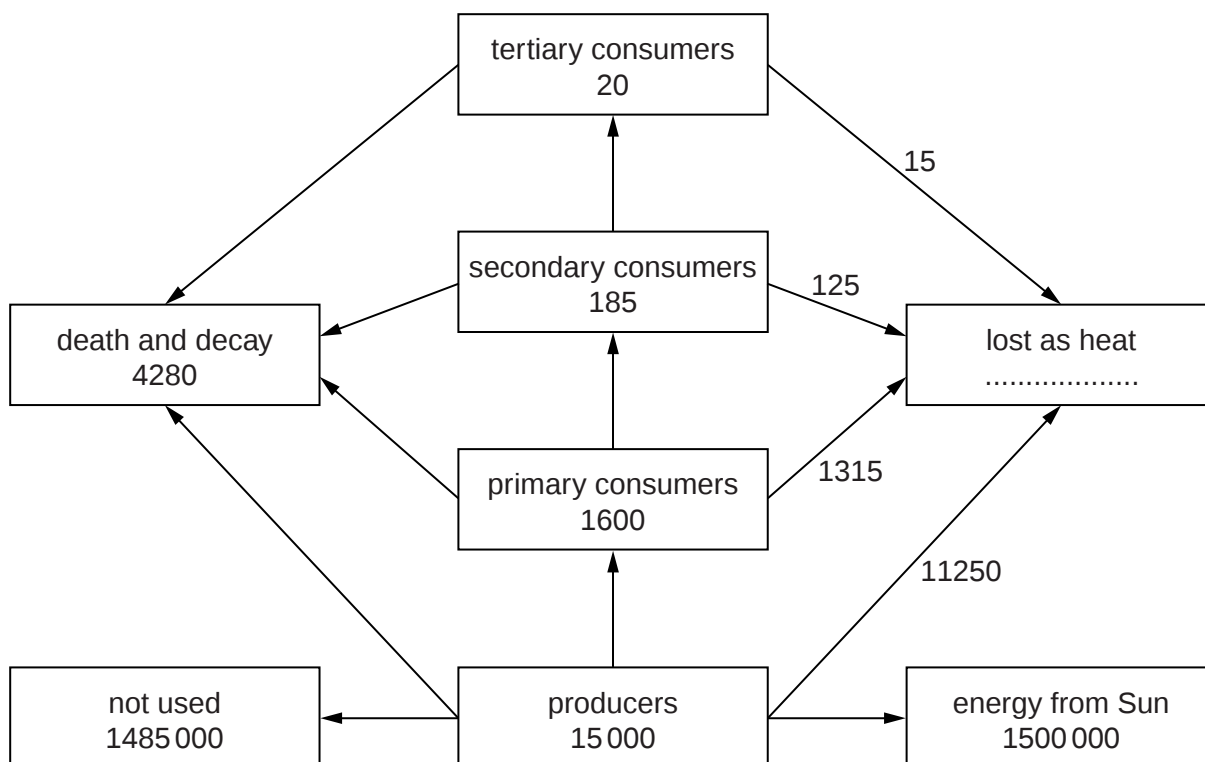


Fig. 2.1

- (a) Complete the box in Fig. 2.1 to show the total energy lost as heat. [1]

- (b) Calculate the percentage of the energy from the Sun which is used by the producers. Show your working.

.....% [2]

- (c) This ecosystem is in the open sea. Suggest why most of the energy from the Sun is **not** used by the producers.

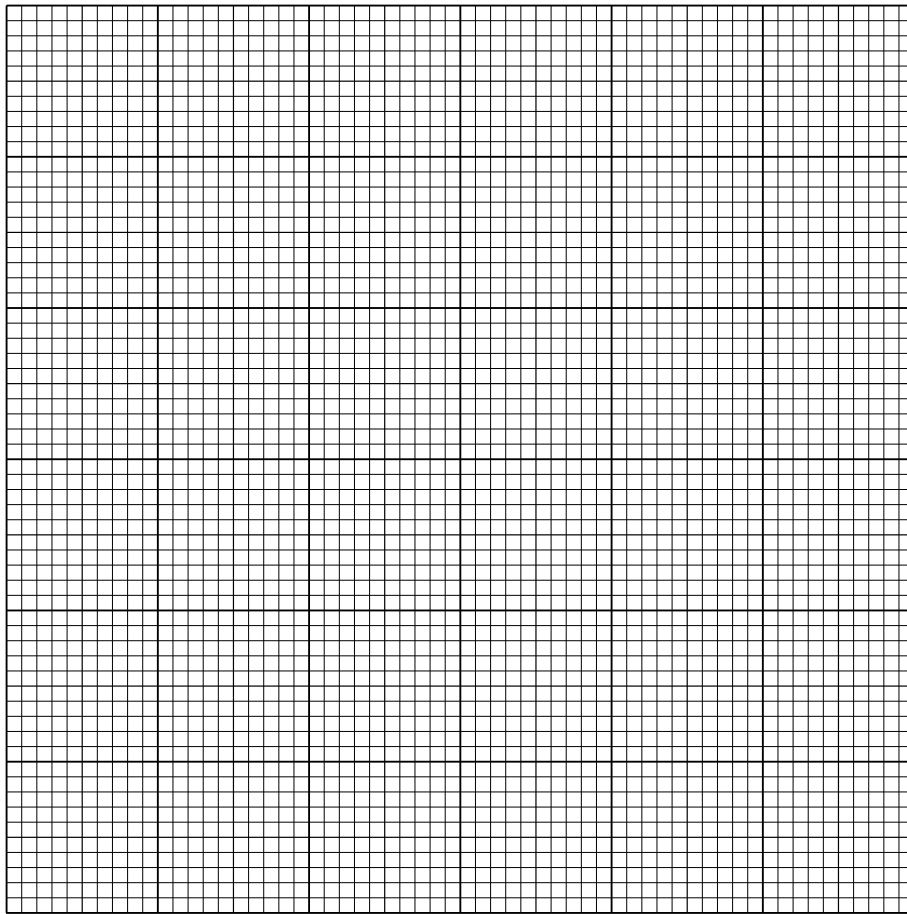
.....

.....

.....

..... [2]

- (d) On the grid below draw a pyramid of energy for the food web shown in Fig. 2.1.



[3]

- (e) In the ecosystem in Fig. 2.1, the initial energy input is from the Sun.
Explain how energy is supplied to organisms at hydrothermal vents.

.....

.....

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.....

.....

.....

.....

.....

[4]

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- 3 (a) Complete Table 3.1 to show **one** biological use for each nutrient.

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Table 3.1

nutrient	biological use
nitrogen	
magnesium	
phosphorus	

[3]

- (b) Fig. 3.1 shows how nutrients are cycled in the sea.

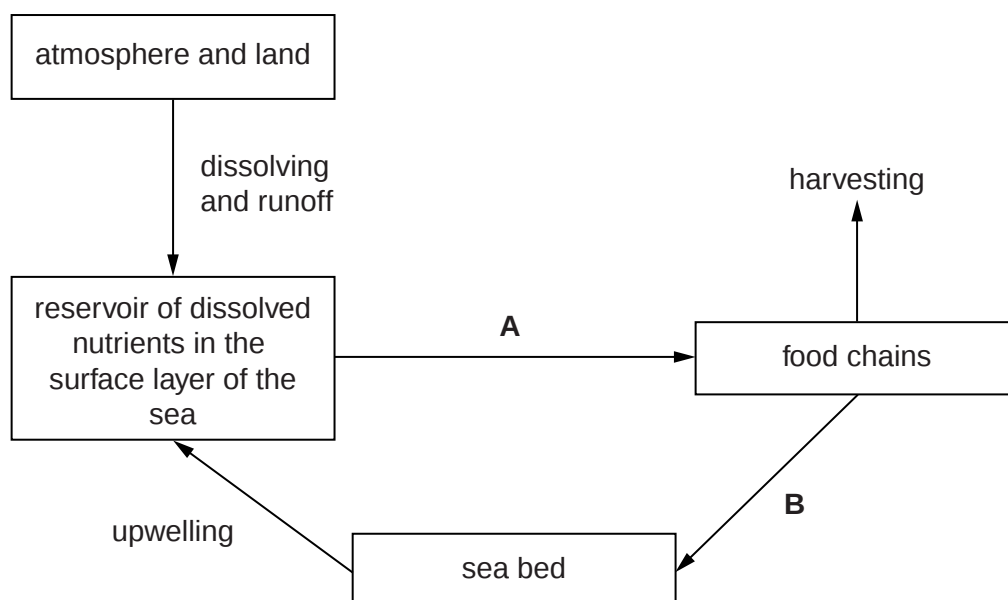


Fig. 3.1

- (i) Name the processes labelled **A** and **B**.

A

B [2]

- (ii) Describe what is meant by *upwelling*.

.....

 [3]

- (iii) Identify **two** processes, shown in Fig. 3.1, that are affected by human activities. For each process, briefly describe how humans are involved.

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process 1

human involvement

.....

.....

process 2

human involvement

.....

..... [4]

- 4 (a) Complete the sentences about coral reefs.
Use words from the list.

anchorage energy erosion flooding harbour

Coral reefs absorb theof waves and so protect the shoreline
from

This provides a number of benefits including protection of coastal properties, protection
of ecosystems and reducing the cost of providing breakwaters.

Reduced wave action also provides safer for boats. [3]

- (b) Suggest why corals need clear water without silt for maximum growth.

.....
.....
.....
..... [2]

- (c) Read the passage below.

A series of controlled explosions has sunk a World War II US troop ship to create an
artificial reef off Florida.

Workers have spent months stripping the vessel of contaminants such as asbestos,
wiring, paint and other potentially toxic substances and debris before the ship was
sunk.

The General Hoyt S Vandenberg sank in less than two minutes after experts
detonated explosives off Key West.

The ship, 523ft long (160m), settled on the bottom of the Florida Keys National
Marine Sanctuary.

Officials hope the reef will attract divers, boosting the economy by \$8m.

They also say fish, coral and other marine life will be drawn to it.

'The sinking of the Vandenberg is the best thing to happen in Key West in years,' said
Mark Rossi, a local businessman who serves as Key West's city commissioner.

- (i) Suggest why asbestos, wiring and paint were removed before the ship was sunk.

.....
.....
.....
..... [2]

- (ii) Suggest how the creation of the artificial reef may boost the economy.

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.....

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.....

..... [2]

- 5 (a) (i) Describe the type of habitat in which mangroves grow.

.....

.....

.....

.....

.....

..... [3]

- (ii) Fig. 5.1 shows two groups of mangrove trees.



A



B

Fig. 5.1

Suggest how the structures labelled **A** and **B** adapt mangroves to their habitat.

A

.....

.....

B

.....

..... [2]

(b) Fig. 5.2 shows the changes in the area of mangrove cover in five parts of the world.

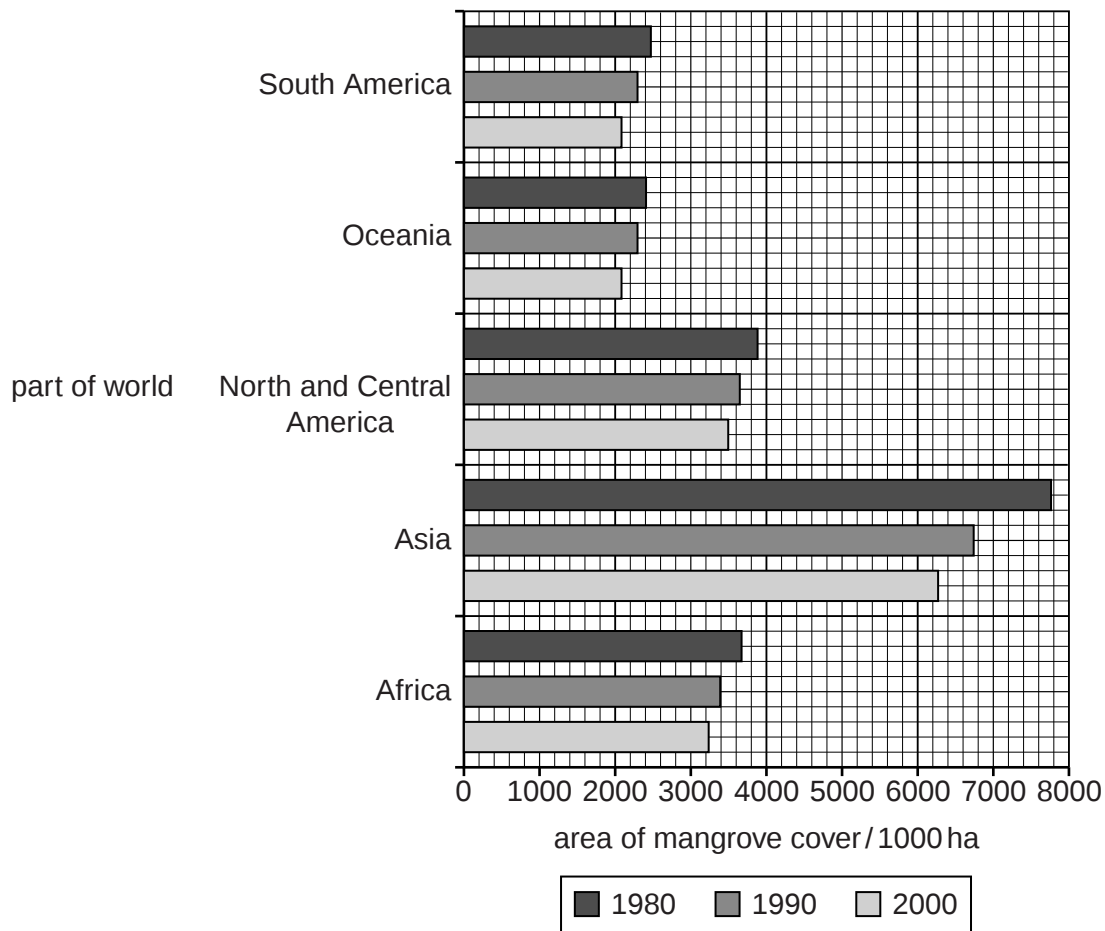


Fig. 5.2

(i) Use Fig. 5.2 to find the area of mangrove cover in Africa in 2000.

..... [1]

(ii) Between 1980 and 2000 the area of mangrove cover decreased in most parts of the world.

Using Fig. 5.2, state the part of the world in which this decrease was the greatest.

..... [1]

(iii) Suggest **two** possible reasons for the decrease.

1

.....

2

..... [2]

6 (a) Outline the theory of plate tectonics.

.....

.....

.....

.....

.....

.....

.....

..... [3]

(b) Tick **three** boxes which show evidence for the theory of plate tectonics. [2]

the process of isostasy	
magnetic stripes on the sea floor	
the erosion of coral reefs	
the distribution of fossils	
the fit between continental coastlines	

(c) Explain how each of the following are formed.

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(i) mid-ocean ridges

.....

.....

.....

.....

..... [4]

(ii) hydrothermal vents

.....

.....

.....

.....

..... [4]

- 7 (a) Explain how atmospheric dissolution of **one named** gas affects the chemical composition of sea water.

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.....

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.....

.....

.....

.....

..... [3]

(b) Fig. 7.1 shows how rainfall, evaporation and changes in temperature affect salinity, density and rising and sinking of sea water.

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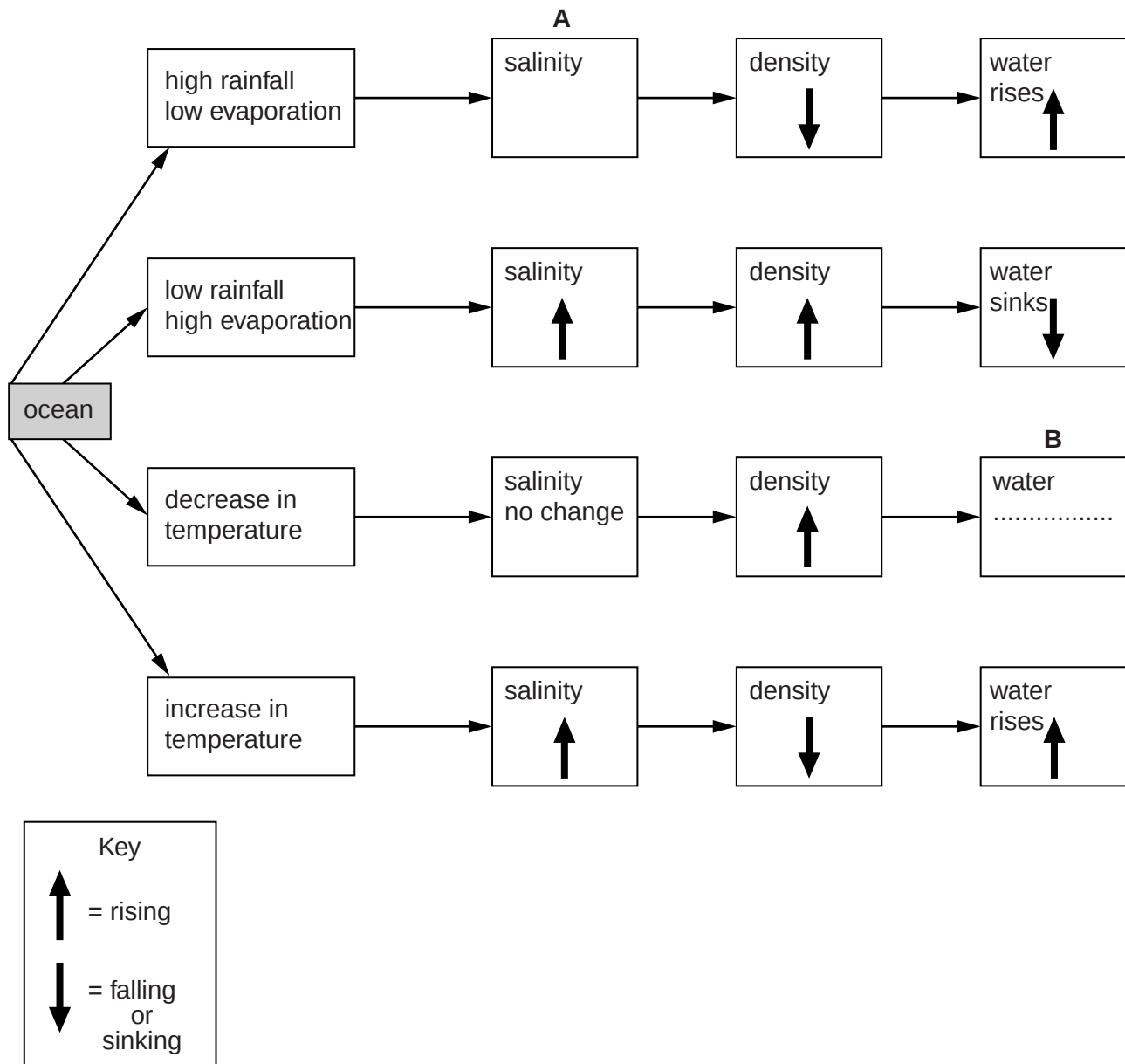


Fig. 7.1

- (i) Draw an arrow in box **A** to show the change in salinity.
Explain your answer.

.....
..... [2]

- (ii) Complete box **B** to show whether the water rises or sinks.
Explain your answer.

.....
..... [2]

- (iii) By means of an annotated diagram, describe how a salinity gradient forms in a water column. [3]

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