CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MARINE SCIENCE **9693/01**

Paper 1 AS Structured Questions **May/June 2012**

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 a pencil for any diagrams, graphs or rough work.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

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.

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

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

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

1 **(a)** Draw a line to link each word with its meaning. [2]

ecosystem		organisms of the same species, living in the same area

population		the living organisms and the physical and chemical factors with which they interact

community		all the different species living in a habitat at the same time

ecological niche		the role of an organism within an ecosystem

(b) Fig. 1.1 shows part of a food web on a sea shore.
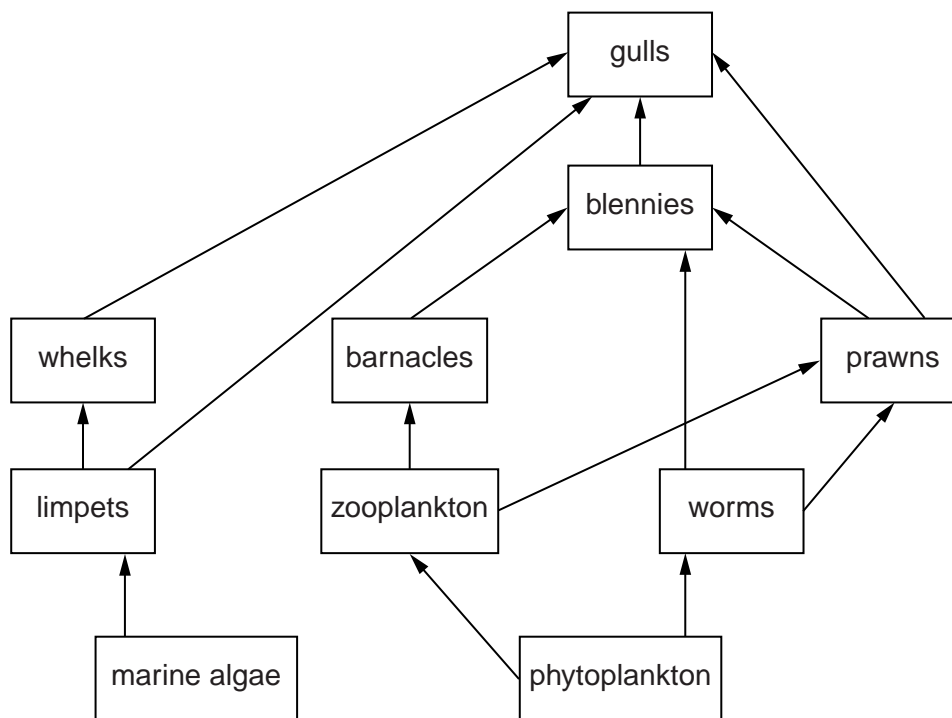
Fig. 1.1

(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.
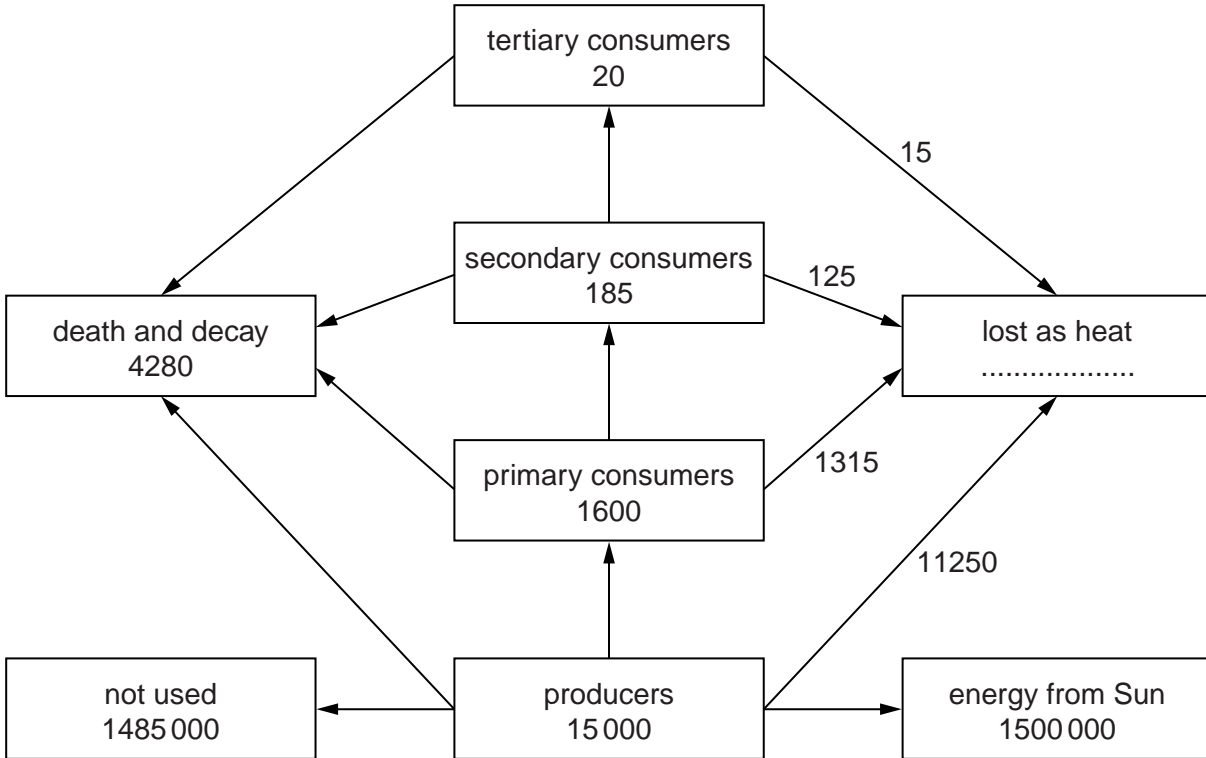
Fig. 2.1

(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.
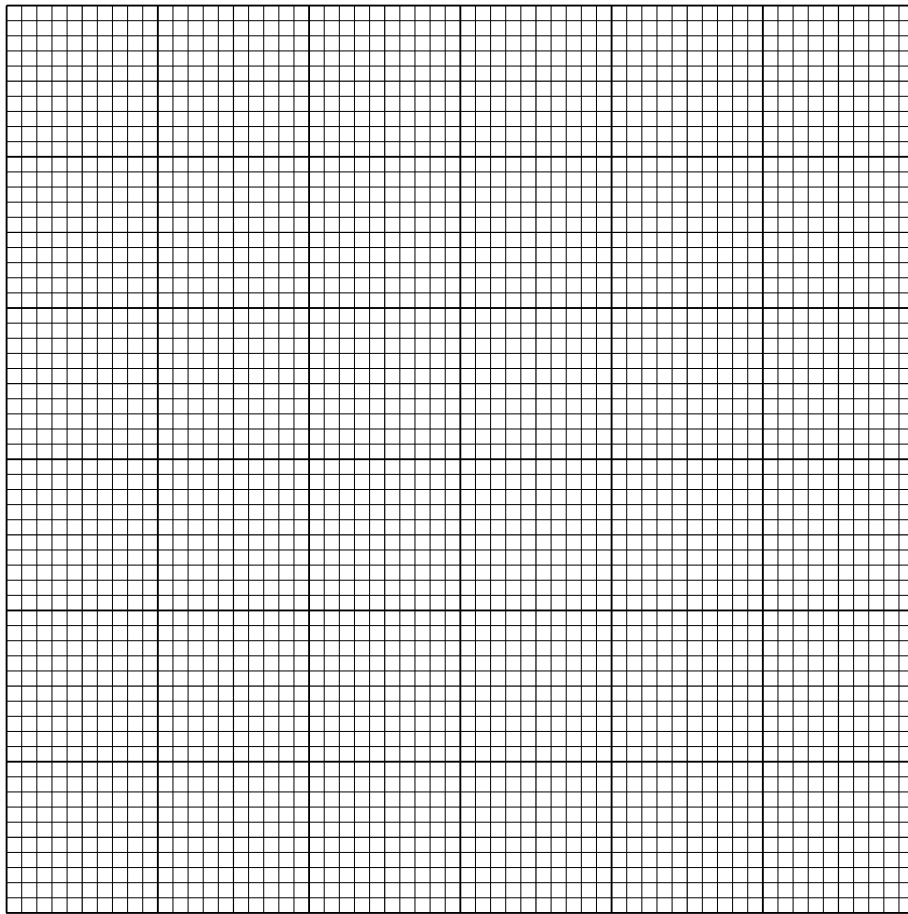
[3]

(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.

....

....

....

....

....

....

....

.... [4]

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

Table 3.1

nutrient	biological use
nitrogen	
magnesium	
phosphorus	

[3]

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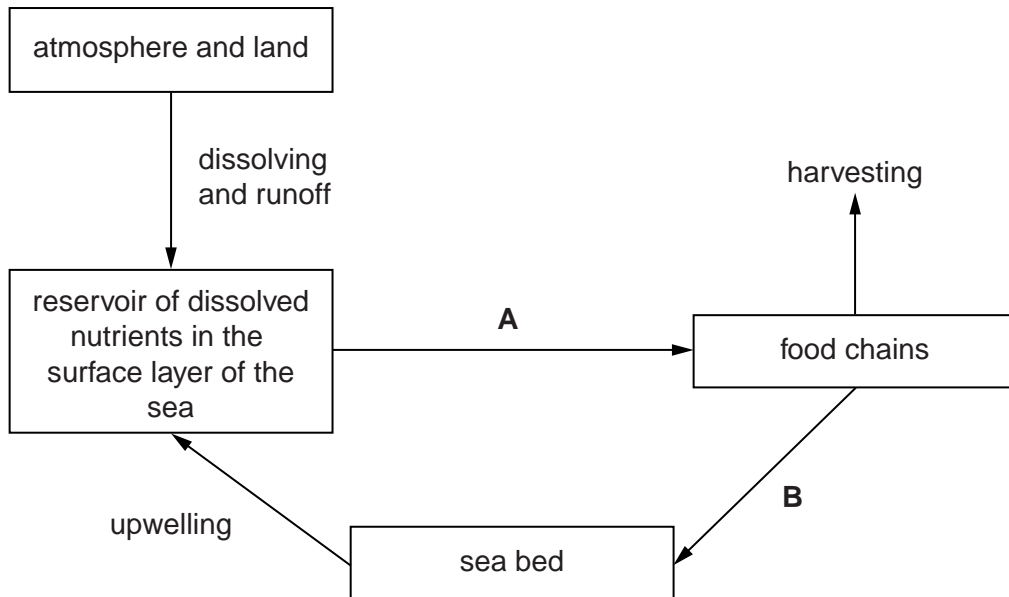
Fig. 3.1

   (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.

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 the ....of 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, 523 ft long (160 m), 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.

....

....

....

.... [2]

 [Turn over

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

....

....

....

....

....

.... [3]

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

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

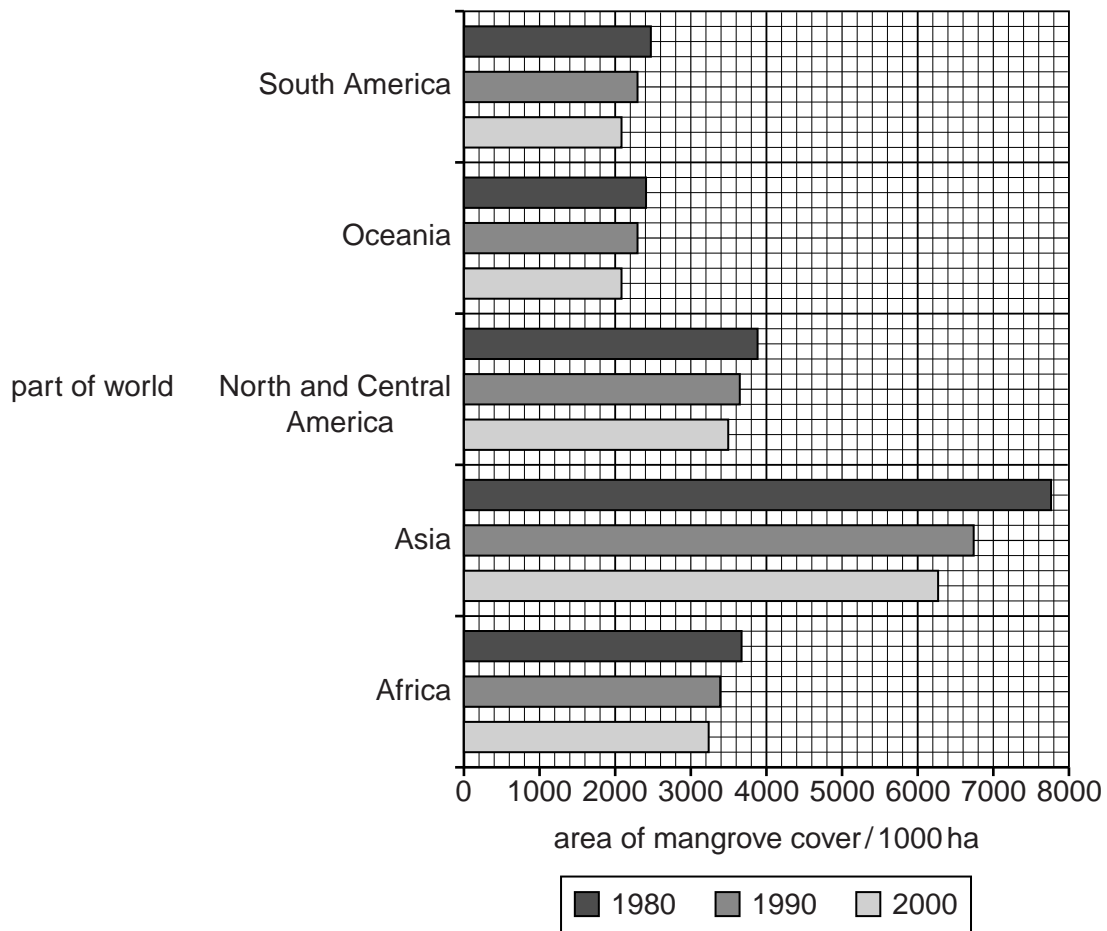**(i)** Use Fig. 5.2 to find the area of mangrove cover in Africa in 2000.

.... [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.

(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.

....

....

....

....

....

....

....

.... [3]

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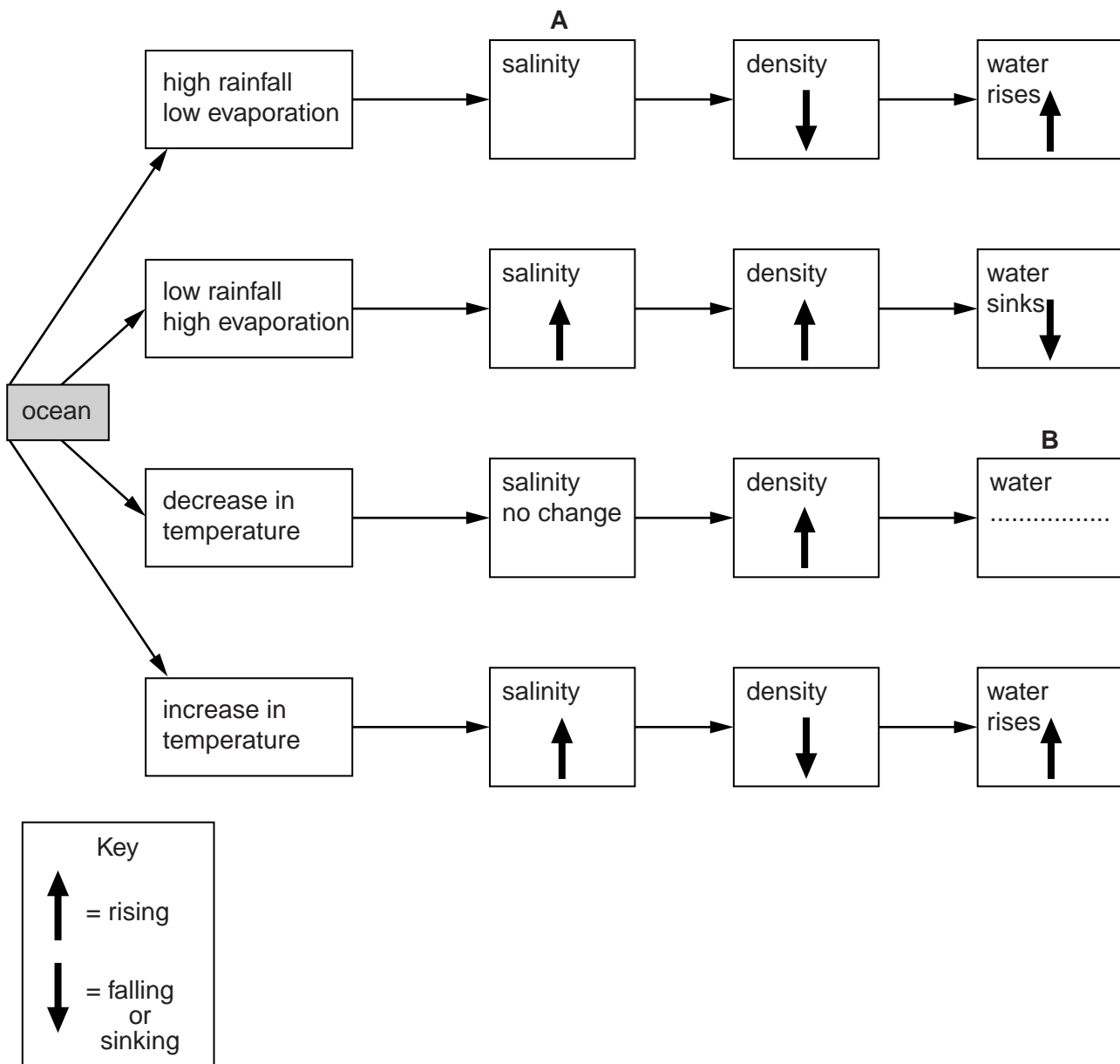
Fig. 7.1

(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]