

CANDIDATE
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ENVIRONMENTAL MANAGEMENT

8291/21

Paper 2 Hydrosphere and Biosphere

October/November 2017

1 hour 30 minutes

Additional Materials: Answer Booklet/Paper

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.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

Section A

Answer **all** questions in this section.
Write your answers in the spaces provided on the question paper.

Section B

Answer **one** question from this section.
Write your answers on the separate answer paper provided.

At the end of the examination,

1. fasten all separate answer paper securely to the question paper;
2. enter the question number from Section B in the grid.

| | For Examiner's Use |
|------------------|--------------------------|
| Section A | / |
| 1 | |
| 2 | |
| Section B | / |
| | |
| Total | |

This document consists of **12** printed pages.

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

- 1 (a) Fig. 1.1 gives information on some effects of increasing urban development on a local water cycle.

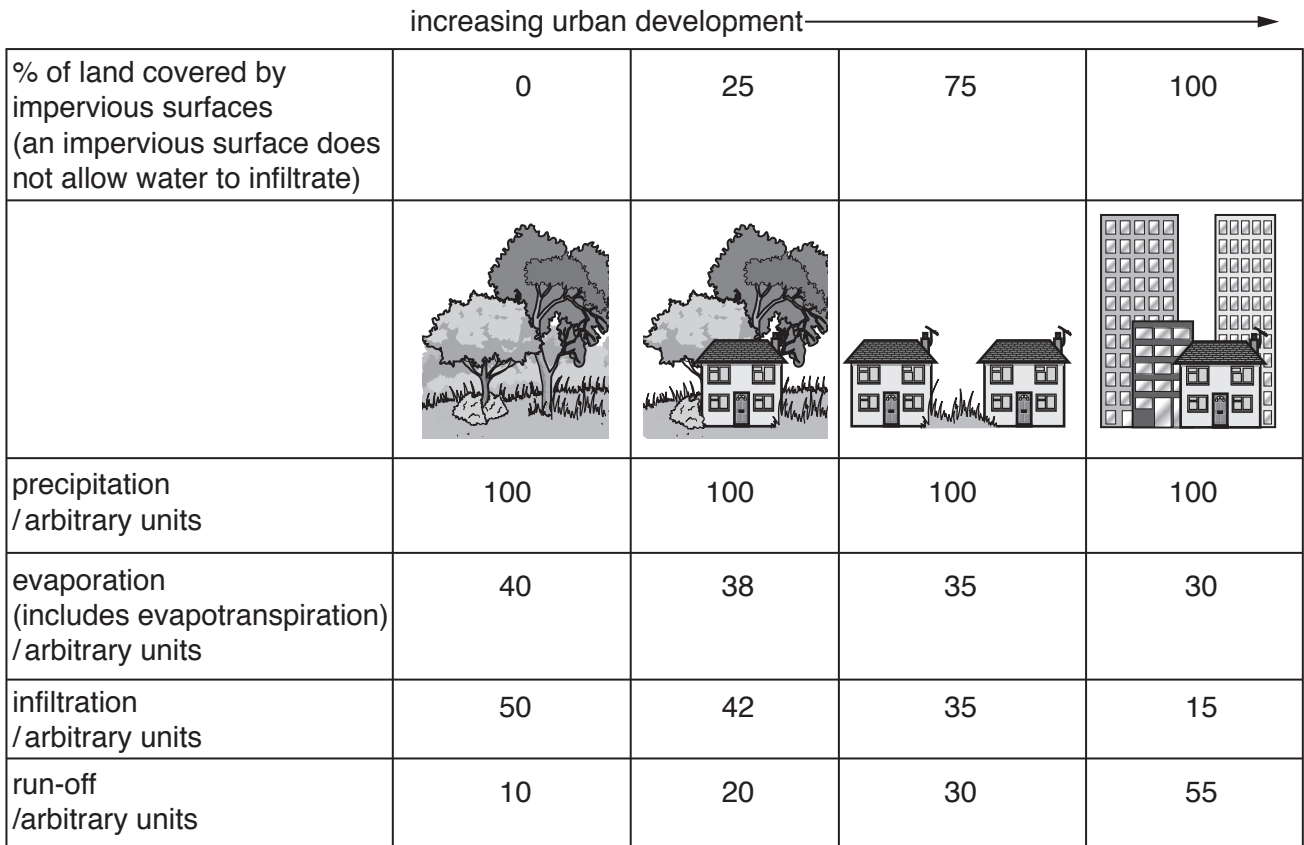


Fig. 1.1

- (i) With reference to Fig. 1.1, describe the trend between increasing urban development and both evaporation and infiltration in this local water cycle.

evaporation

.....

.....

.....

infiltration

.....

.....

.....

[4]

- (ii) Using the data in Fig. 1.1, calculate the percentage increase in run-off from 0% land covered by impervious surfaces to 100% land covered by impervious surfaces.

Show your working.

.....% [2]

- (iii) Explain why an increase in the percentage of land covered by impervious surfaces increases run-off.

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

- (iv) Briefly explain **two** effects of run-off from urban areas on a river environment.

.....
.....
.....
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.....
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..... [4]

(b) Fig. 1.2 shows a vegetation zoning system designed to reduce the impact of human activity on a river environment.

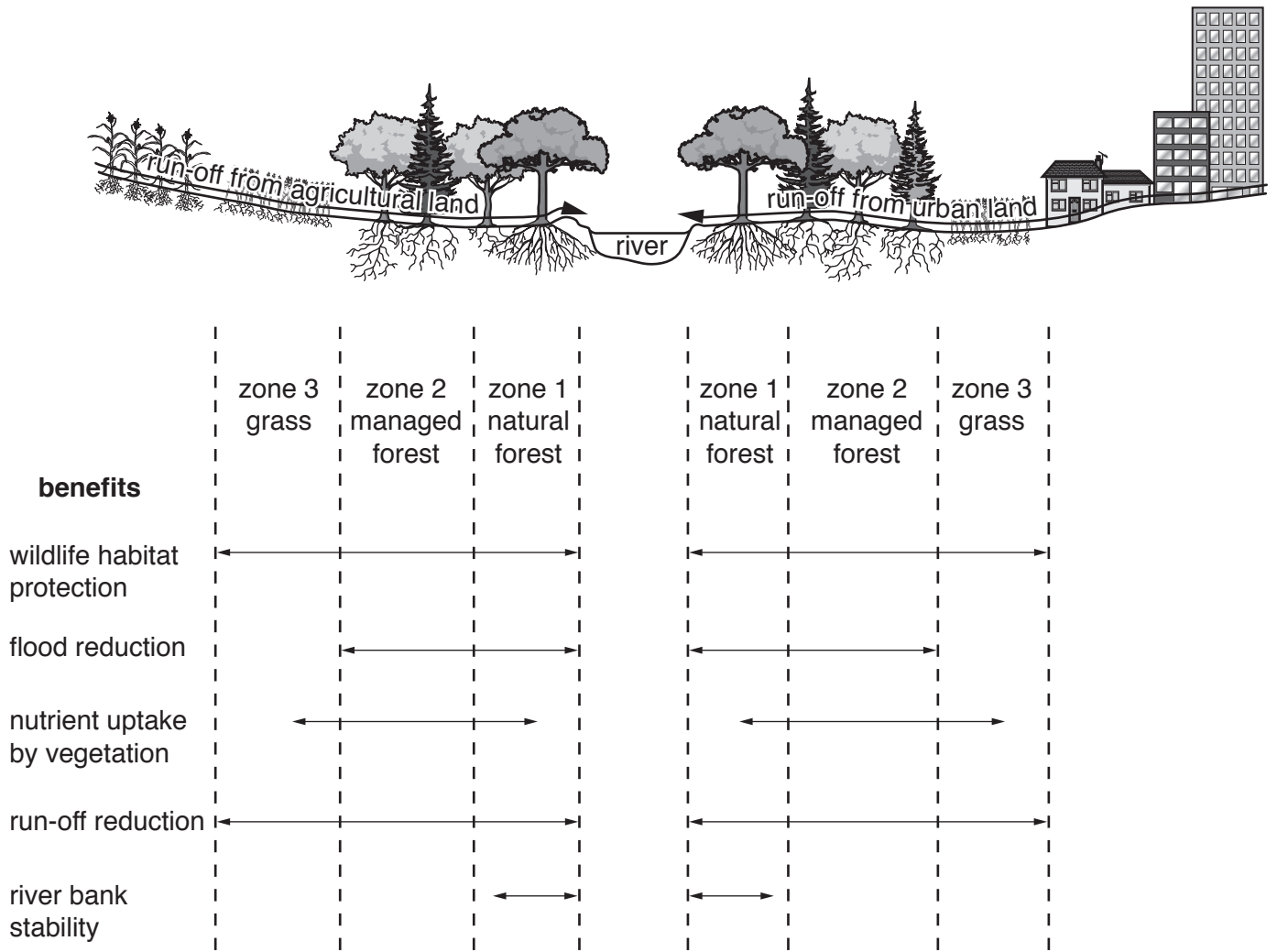


Fig. 1.2

2 (a) Fig. 2.1 shows part of a food web for a coral reef ecosystem.

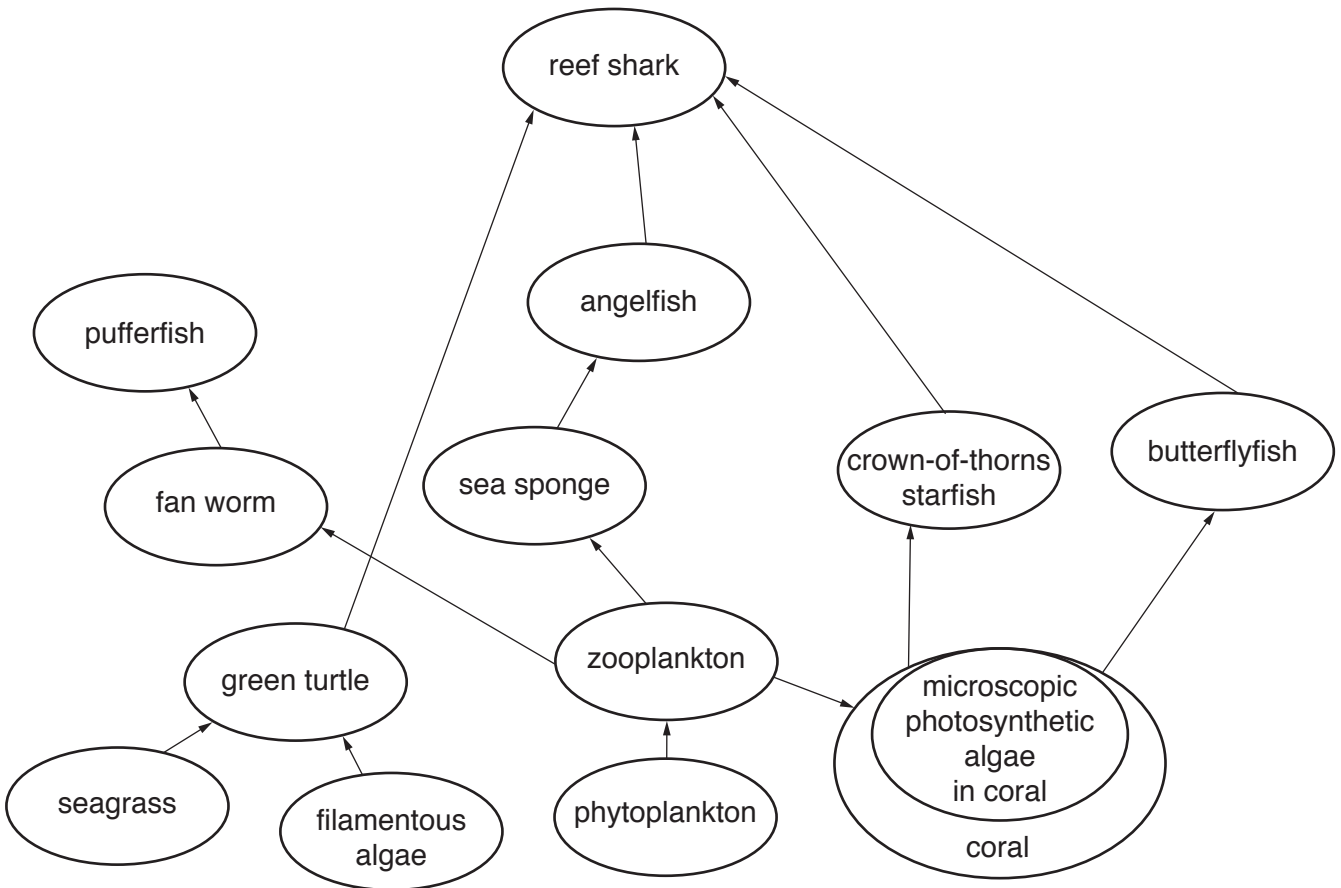


Fig. 2.1

(i) From Fig. 2.1, identify **one** organism at:

the first trophic level

.....

the second trophic level

.....

the third trophic level.

.....

[2]

- (ii) Suggest the role of the microscopic photosynthetic algae living within the coral, as shown in Fig. 2.1.

.....

.....

.....

..... [2]

- (iii) With reference to Fig. 2.1, describe and explain **one** effect of an increase in the number of crown-of-thorns starfish on the amount of coral.

.....

.....

.....

..... [2]

- (iv) With reference to Fig. 2.1, explain **one** effect of overfishing in the seas around the coral reefs.

.....

.....

.....

..... [2]

(b) Fig. 2.2 shows the threats to and the impact of human activity on coral reefs.

The map is divided into two regions, region **A** South East Asia and region **B** Australia and Papua New Guinea.

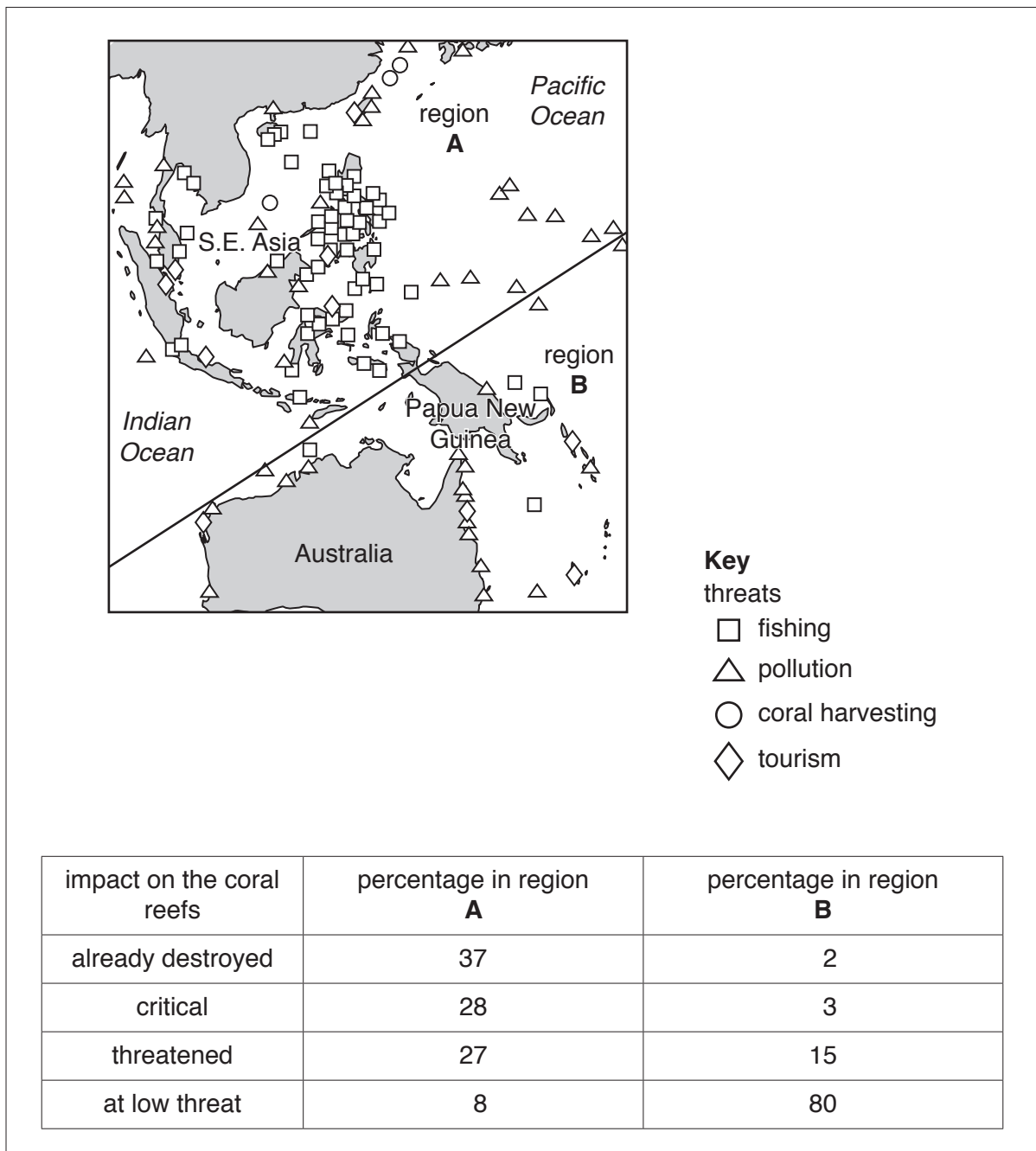


Fig. 2.2

Section B

Answer **one** question from this section.

Write your answers on the separate answer paper provided.

- 3 Fig. 3.1 is a diagram representing energy flow and nutrient recycling in an ecosystem.

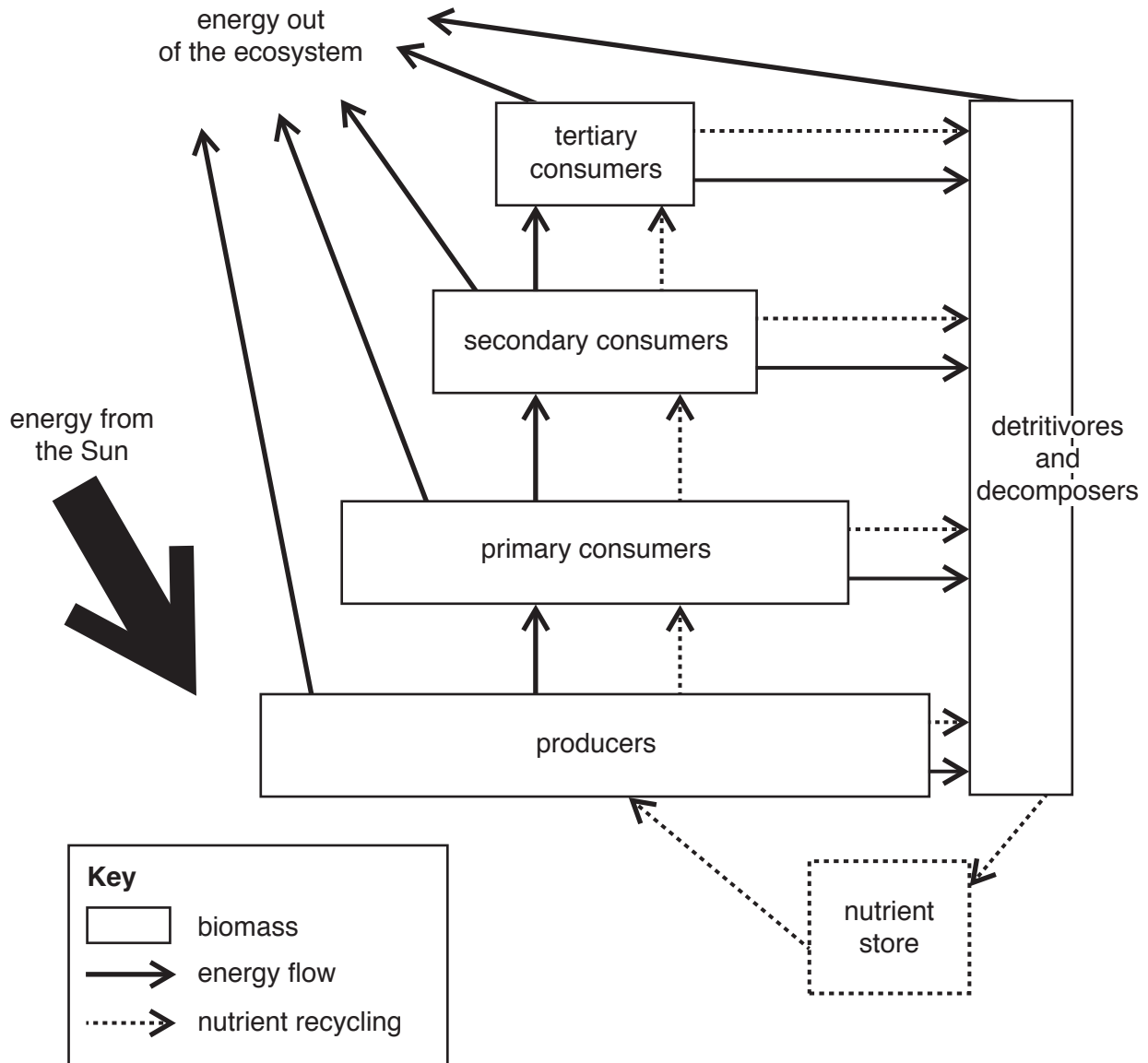


Fig. 3.1

- (a) With reference to Fig. 3.1, describe the flow of energy and the recycling of nutrients in an ecosystem. [10]
- (b) Describe the impact of deforestation on forest ecosystems. Using examples, assess the strategies used to reduce the pressures on forest ecosystems. [30]

[Total: 40]

4 Fig. 4.1 shows the sources of water for a city in a developed country in 2005 and 2010.

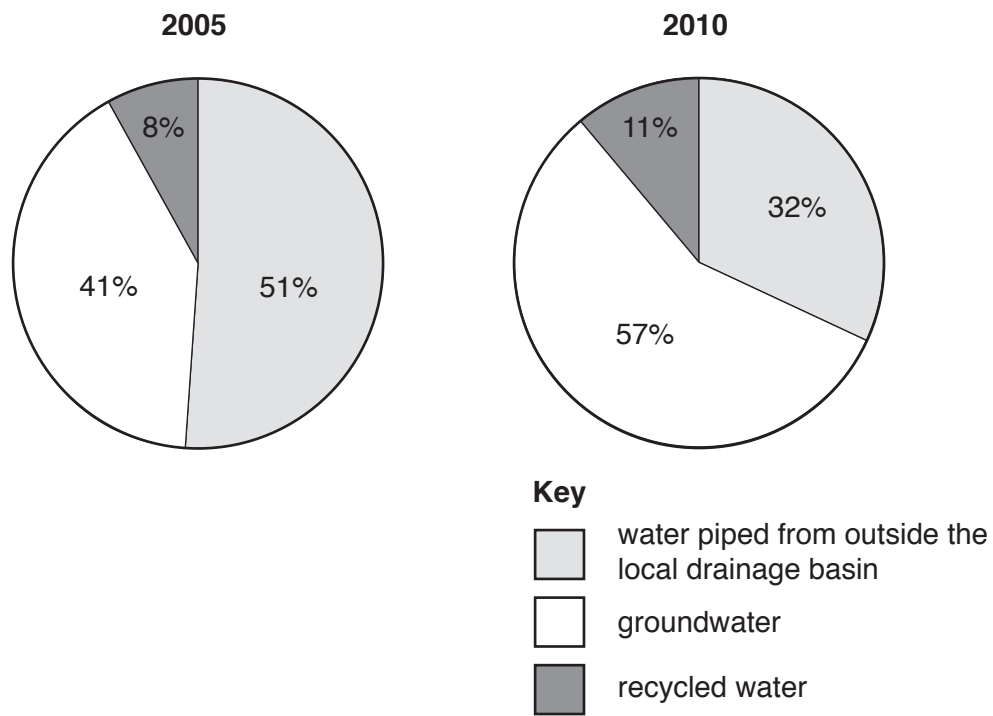


Fig. 4.1

- (a) With reference to Fig. 4.1, describe the changes in the sources of water between 2005 and 2010. Suggest reasons for these changes. [10]
- (b) Using examples from arid countries, assess the advantages and disadvantages of supplying water from groundwater and supplying water by the process of desalination. [30]

[Total: 40]

- 5 Fig. 5.1 shows changes in global crop production. These are expressed in millions of tonnes of some important crops available for the global population.

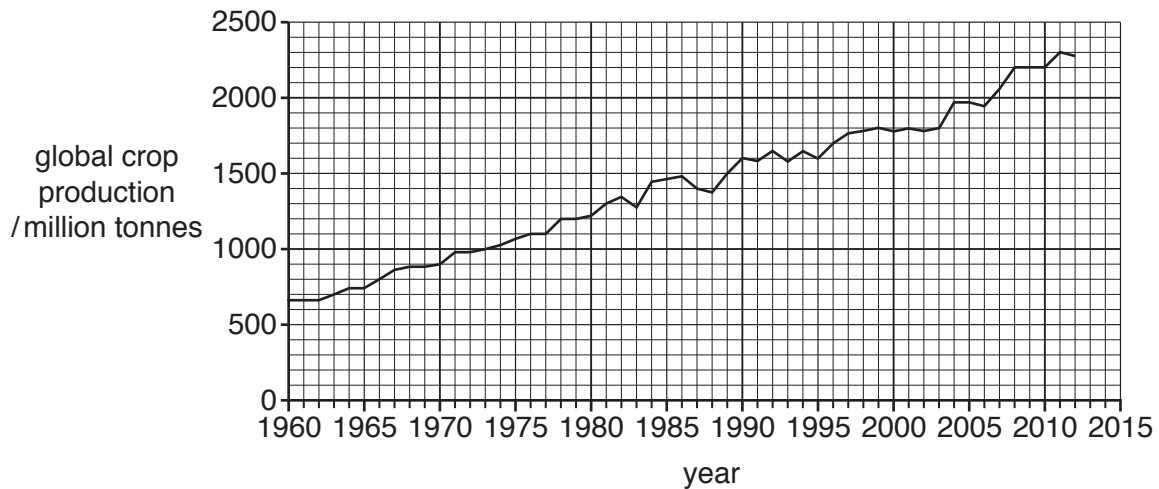


Fig. 5.1

- (a) Describe the trends in global crop production shown in Fig. 5.1. Suggest reasons for the variations. [10]
- (b) With reference to examples of countries at contrasting levels of economic development, assess whether increasing food production is sustainable with an increasing global population. [30]

[Total: 40]

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