Cambridge International AS Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				
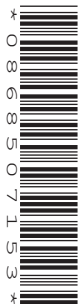
ENVIRONMENTAL MANAGEMENT 8291/22

Paper 2 Hydrosphere and Biosphere **October/November 2019**

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.

Cambridge Assessment
International Education

[Turn over

Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 **(a)** Fig. 1.1 is a diagram showing energy flow through an ecosystem.

energy from the sun

gross primary production

respiration

net primary production

feeding

consumers

respiration

death

excretion

X

respiration
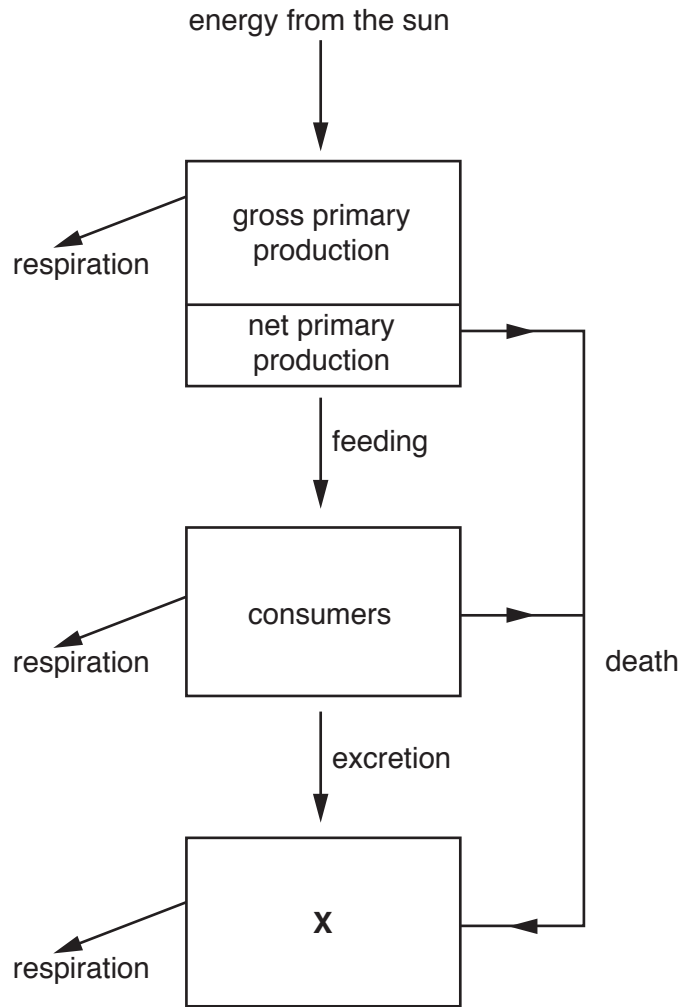
Fig. 1.1

(i) State what **X** represents in Fig. 1.1.

.... [1]

(ii) Use Fig. 1.1 to explain the difference between gross primary production and net primary production.

....

....

....

.... [2]

(iii) State two abiotic factors that affect the rate of primary productivity.

1. ....

2. ....
[2]

(iv) Name the process by which primary producers synthesise organic molecules using energy from the sun.

.... [1]

(v) State the biome with the highest net primary productivity.

.... [1]

(b) Fig. 1.2 is a pyramid of biomass for a temperate deciduous forest food chain.

wolves $(420 \, kg / km^2)$

red foxes $(2 \, 100 \, kg / km^2)$

snowshoe hares $(20 \, 925 \, kg / km^2)$

grass $(2.0925 \times 10^7 \, kg / km^2)$
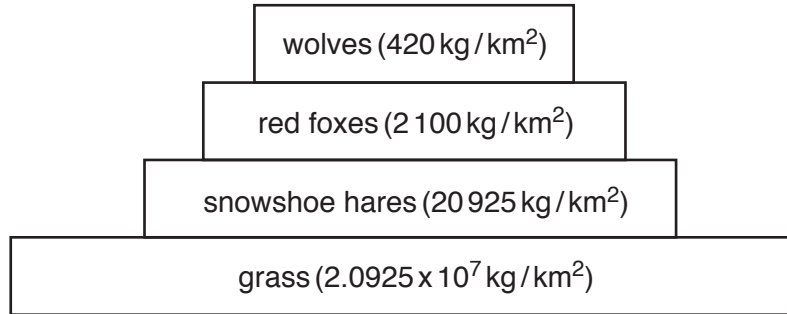
Fig. 1.2

(i) State the primary consumer shown in Fig. 1.2.

.... [1]

(ii) Describe what a pyramid of biomass shows.

....

....

....

.... [2]

(iii) Explain the shape of the pyramid of biomass shown in Fig. 1.2.

....

....

....

.... [2]

(iv) If the population of wolves decreased, state and explain **two** changes that could occur in the food chain shown in Fig. 1.2.

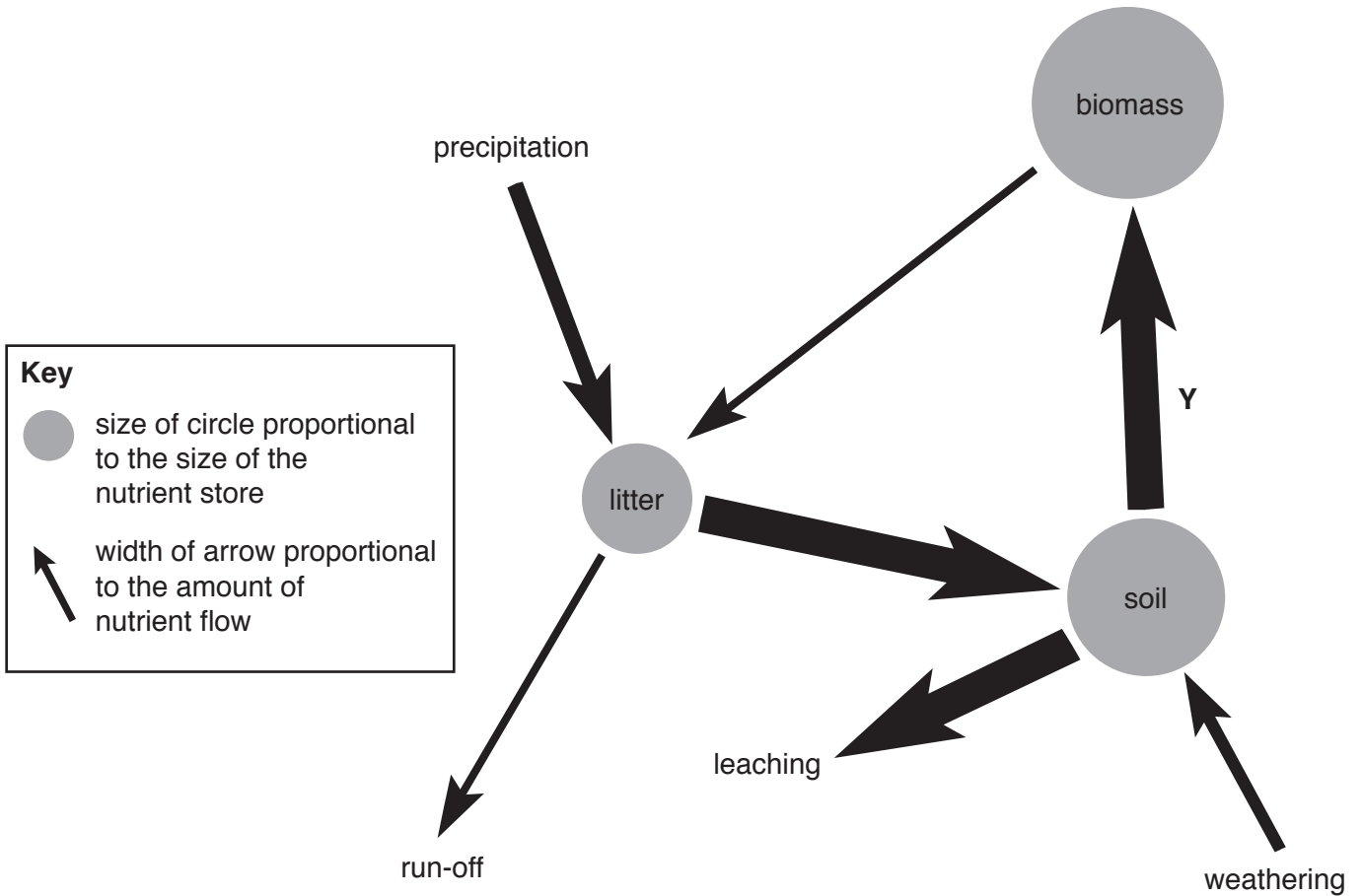..

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....

.... [4]

(c) Fig. 1.3 shows the nutrient flows and stores for a temperate deciduous forest.

Fig. 1.3

(i) Describe the method by which nutrients flow in the process labelled **Y** on Fig. 1.3.

.... [1]

(ii) With reference to Fig. 1.3, describe the changes which might occur to the forest nutrient stores and flows as a result of deforestation.

....

....

....

....

....

.... [3]

[Total: 20]

[Turn over

2 **(a)** Fig. 2.1 shows the flows and stores of water in the global hydrological cycle. A number is given to indicate the amount of water within each flow or store.
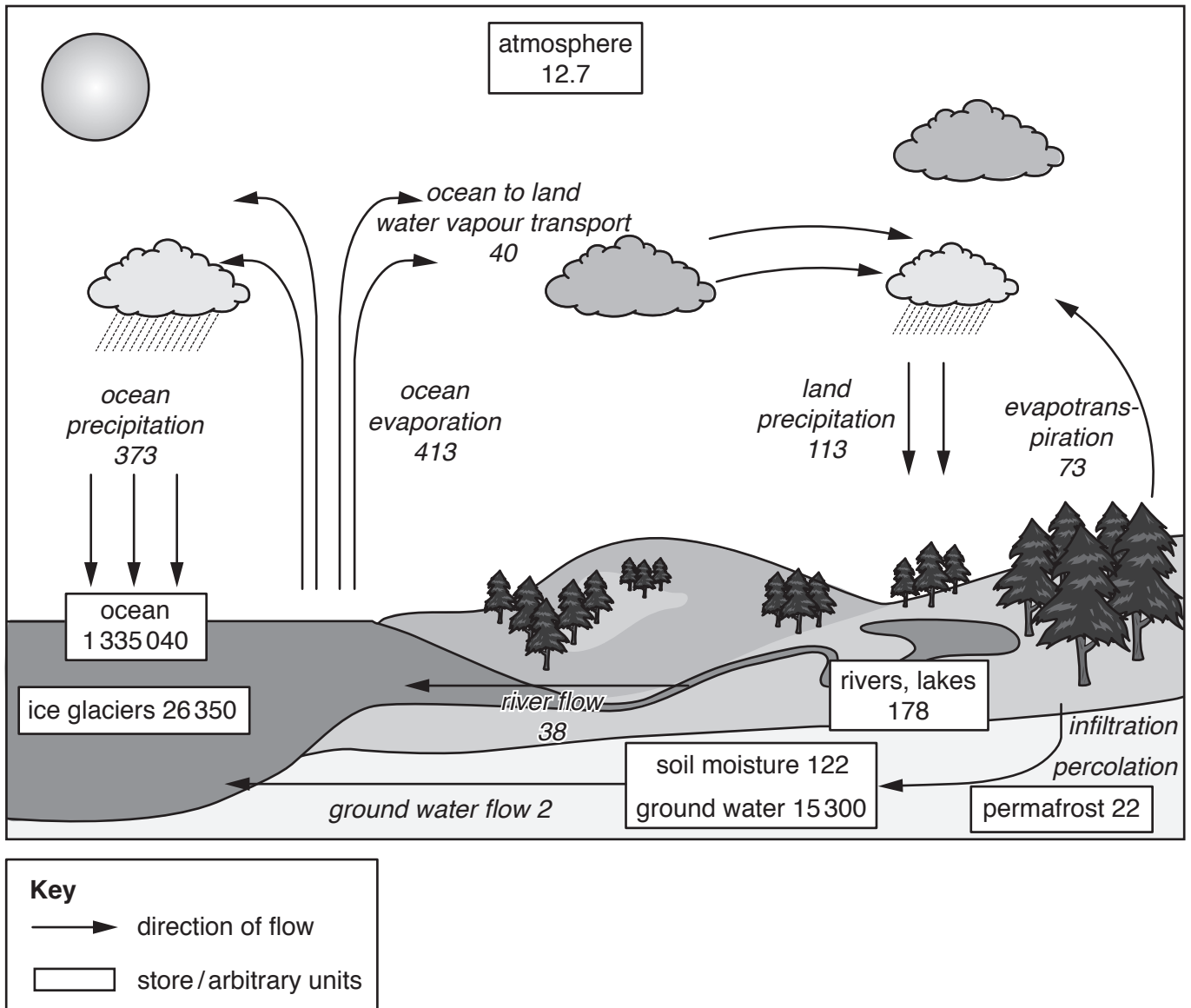
atmosphere
12.7

ocean to land
water vapour transport
40

ocean
precipitation
373

ocean
evaporation
413

land
precipitation
113

evapotrans-
piration
73

ocean
1 335 040

ice glaciers 26 350

river flow
38

rivers, lakes
178

infiltration

percolation

soil moisture 122

ground water 15 300

permafrost 22

ground water flow 2

Key

→ direction of flow

☐ store / arbitrary units

Fig. 2.1

(i) State where most of the water that has evaporated from the oceans falls as precipitation shown in Fig. 2.1.

.... [1]

(ii) Calculate the total amount of stored water in Fig. 2.1.

.... arbitrary units [2]

(iii) The global hydrological cycle is a closed system.

Explain reasons why a local hydrological cycle, such as in a drainage basin, can **not** be described as a closed system.

....

....

....

....

....

....

....

.... [4]

(iv) Describe **two** ways in which human activities can affect a local hydrological cycle.

....

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.... [4]

(b) Fig. 2.2 is a map showing the predicted loss of land to the sea as a result of a rise in sea levels of 3 metres in Florida, United States of America.
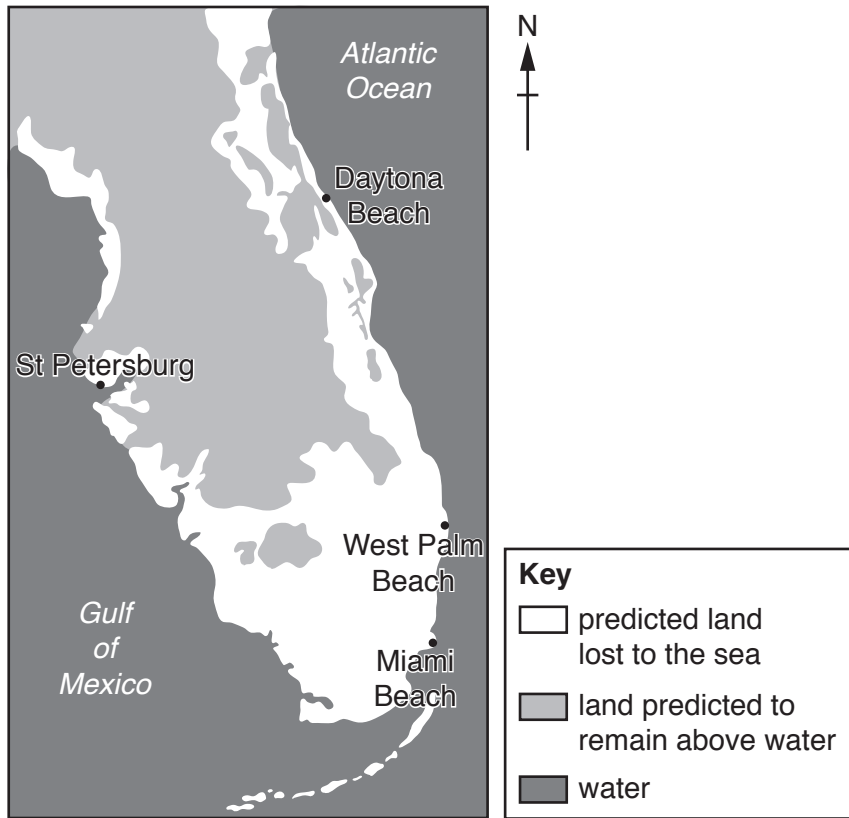

Fig. 2.2

(i) Suggest causes for the predicted rise in sea levels shown in Fig. 2.2.

....

....

....

....

....

....

....

.... [4]

(ii) Describe strategies that could be used to manage the effects of coastal inundation caused by a rise in sea level of 3 metres, such as that shown in Fig. 2.2.

....

....

....

....

....

....

....

....

....

.... [5]

[Total: 20]

Section B

Answer **one** question from this section.

Write your answers on the separate answer paper provided.

3   Fig. 3.1 is two photographs showing farming in countries at different levels of economic development.

photograph **A**
(harvesting potatoes)

photograph **B**
(harvesting grain)

Fig. 3.1

(a) Describe the effects that the farming shown in Fig. 3.1 might have on local habitats.   [10]

(b) Using examples, assess the methods used to maintain a sustainable food supply in countries at different levels of economic development.   [30]

[Total: 40]

4 Table 4.1 shows the percentage of the total human population that live on arid or semi-arid land for each continent.

Table 4.1

continent	percentage of total human population that live on arid or semi-arid land
Africa	40
Asia	39
Oceania	25
Europe	26
North America	22
South America	30

(a) Describe problems faced by people living on arid or semi-arid land. [10]

(b) Using examples, assess the strategies used by countries at different levels of economic development to manage the sustainable supply of water. [30]

[Total: 40]

5 Fig. 5.1 shows the relationship between average annual precipitation and temperature for some major biomes.
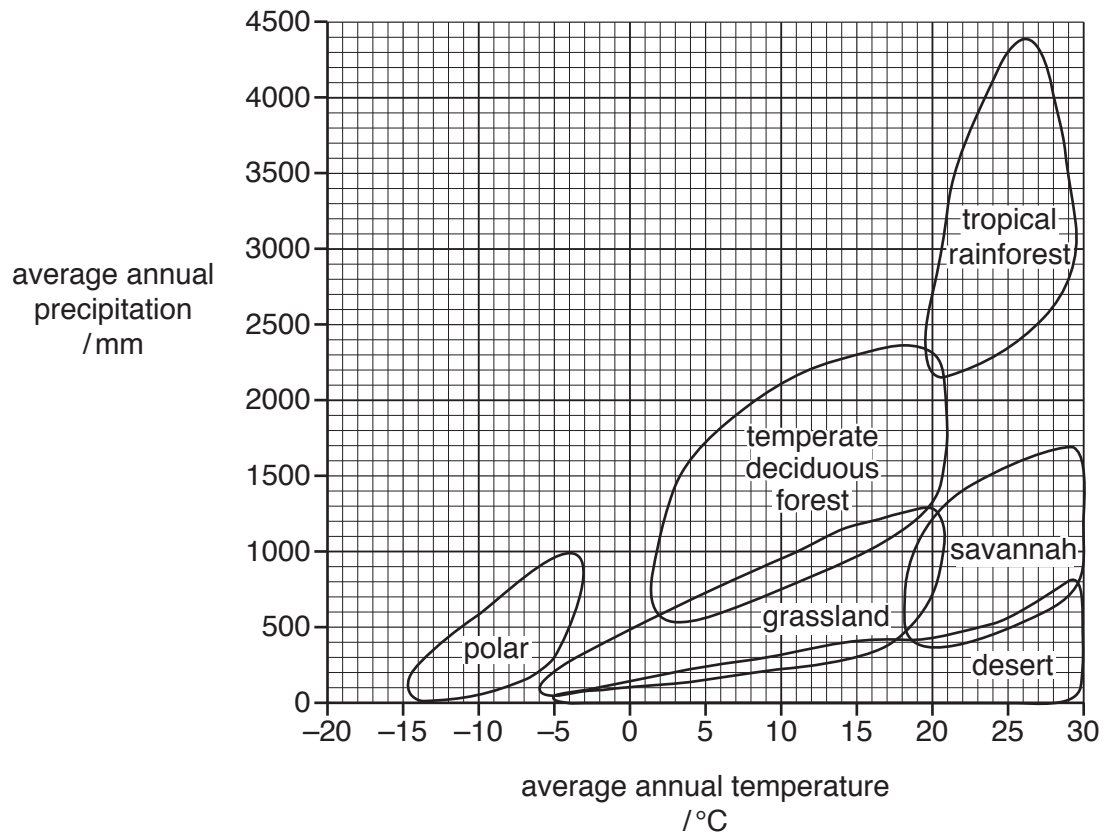
Fig. 5.1

(a) Describe how biotic and abiotic factors control the distribution of the biomes shown in Fig. 5.1.
[10]

(b) Using examples, assess conservation methods used to maintain biodiversity in ecosystems.
[30]

[Total: 40]