Cambridge International **AS Level**

Cambridge International Examinations
Cambridge International Advanced Subsidiary Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

3867074657

ENVIRONMENTAL MANAGEMENT **8291/21**

Paper 2 Hydrosphere and Biosphere **October/November 2015**

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.
Write your answers in the spaces provided on the question paper.

Section B
Answer **one** question from this section.
Answer the question 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 opposite.

	For Examiner's Use
Section A	
1	
2	
Section B	
Total	

This document consists of **12** printed pages and **4** blank pages.

CAMBRIDGE International Examinations

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Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

1 (a) Table 1.1 contains data on the biomass of marine and terrestrial ecosystems**.**

Table 1.1

ecosystem	area / 10^6 km^2	biomass per unit area / kg per m^2	average biomass per unit area / kg per m^2
ocean (marine)	332	0–0.005	0.0025
tropical rainforest (terrestrial)	17	6–80	37

(i) State what is meant by the term *biomass.*

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.....[2]

(ii) With reference to Table 1.1, compare the biomass for the ocean and the tropical rainforest ecosystems.

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.....[2]

[Turn over

(b) Fig. 1.1 shows the energy flows through an ocean (marine) and a forest (terrestrial) ecosystem. The size of the circles and width of the arrows indicate the relative size of the biomass stores and energy flows at each trophic level for each ecosystem.

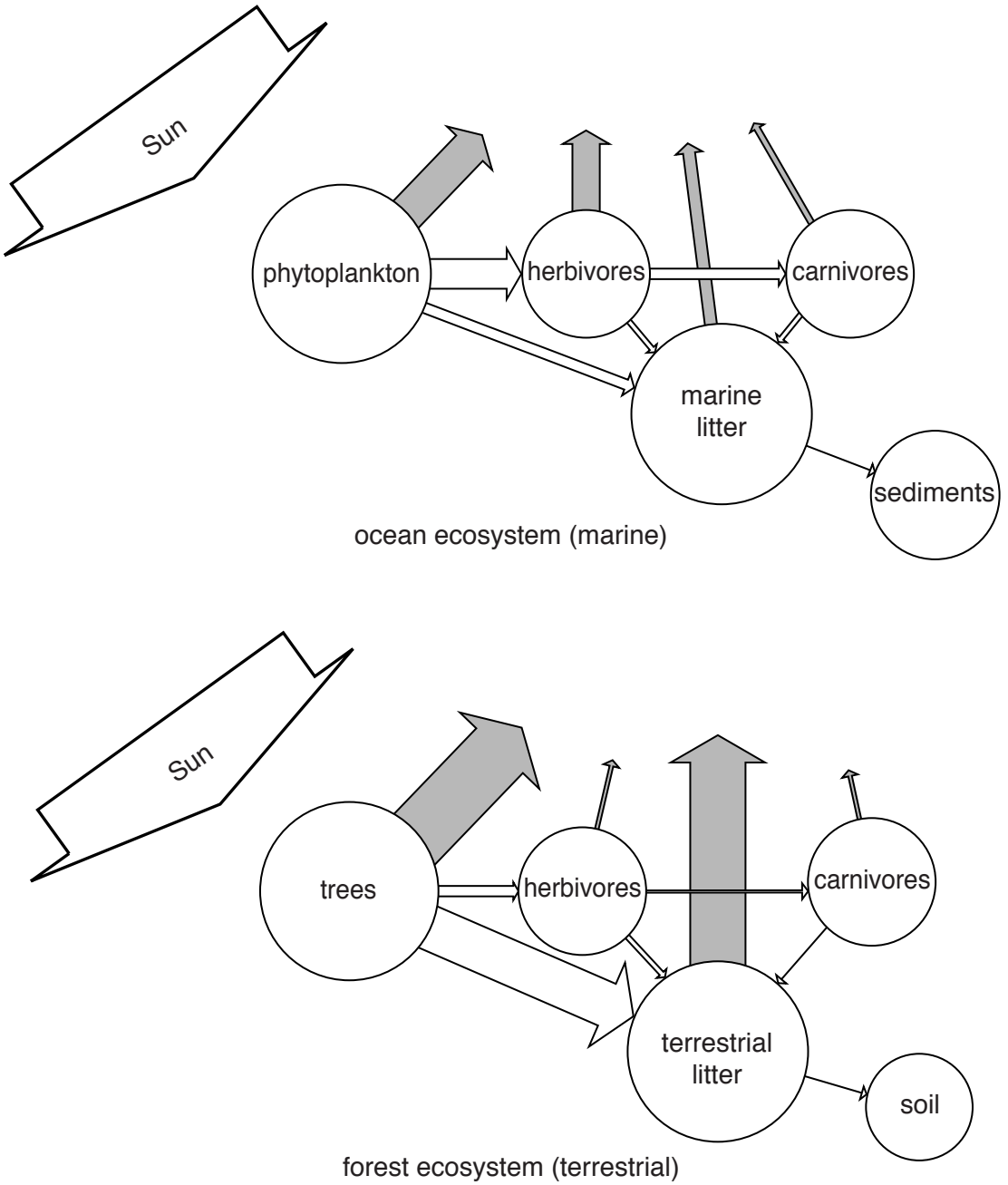

Fig. 1.1

(i) With reference to Fig. 1.1, give an example of a food chain.

.....[1]

(ii) With reference to Fig. 1.1, state which ecosystem loses most energy to the environment.

.....[1]

(iii) Identify the producer organism in the ocean (marine) ecosystem in Fig. 1.1.

.....[1]

(iv) With reference to Fig. 1.1, explain how the producers in the food chains obtain their energy.

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.....[4]

(v) With reference to Fig. 1.1, describe **three** differences in the energy flow in the two ecosystems**.**

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(vi) Suggest why food chains in an ocean (marine) ecosystem often have more links than in a forest (terrestrial) ecosystem.

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[Total: 20]

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2 **(a)** Table 2.1 contains data on the volumes and the percentages of global water stores.

Table 2.1

water store	water volume / km^3	freshwater / %	total water / %
oceans, seas and bays	1 338 000 000	n/a	96.54
ice caps, glaciers and permanent snow	24 064 000	68.7	1.74
freshwater groundwater	10 530 000	30.1	0.76
saline groundwater	12 870 000	n/a	0.93
ground ice and permafrost	300 000	0.8	0.02
saline lakes	85 400	n/a	<0.01
freshwater lakes	91 000	0.4	0.01
soil moisture	16 500		
atmosphere	12 900		
freshwater swamp	11 470		
rivers	2120		
biological water	1120		

Key
n/a not applicable

(i) With reference to Table 2.1, calculate the percentage of the global water stored as groundwater.

..... % [2]

(ii) With reference to Table 2.1, calculate the percentage of the global water stored as freshwater.

..... % [2]

(iii) With reference to Table 2.1, describe **two** ways in which water can move between different stores.

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.....[4]

(iv) Describe the effect global warming may have on the volume of water contained in the natural stores shown in Table 2.1.

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(b) Fig. 2.1 shows some urban areas of the greater New York City region that could be affected by a permanent rise in sea level of one metre by 2100.

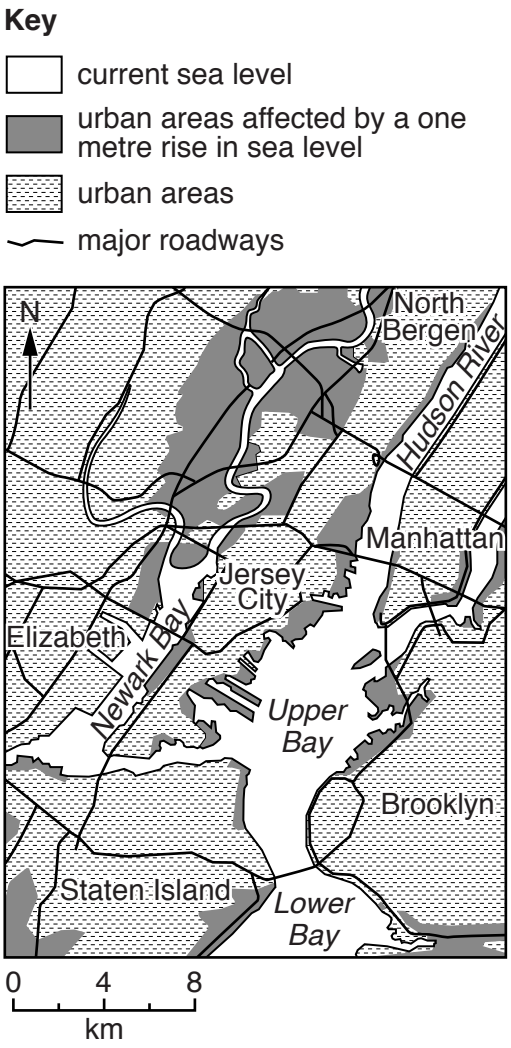

Fig. 2.1

With reference to Fig. 2.1, describe the possible threats to the urban communities of the greater New York City region, from a permanent rise in sea level of one metre by 2100.

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[Total: 20]

Section B

Answer **one** question from this section.

3 Fig. 3.1 shows the distribution of the critically endangered giant panda populations remaining in the mountainous bamboo forests of Central China.

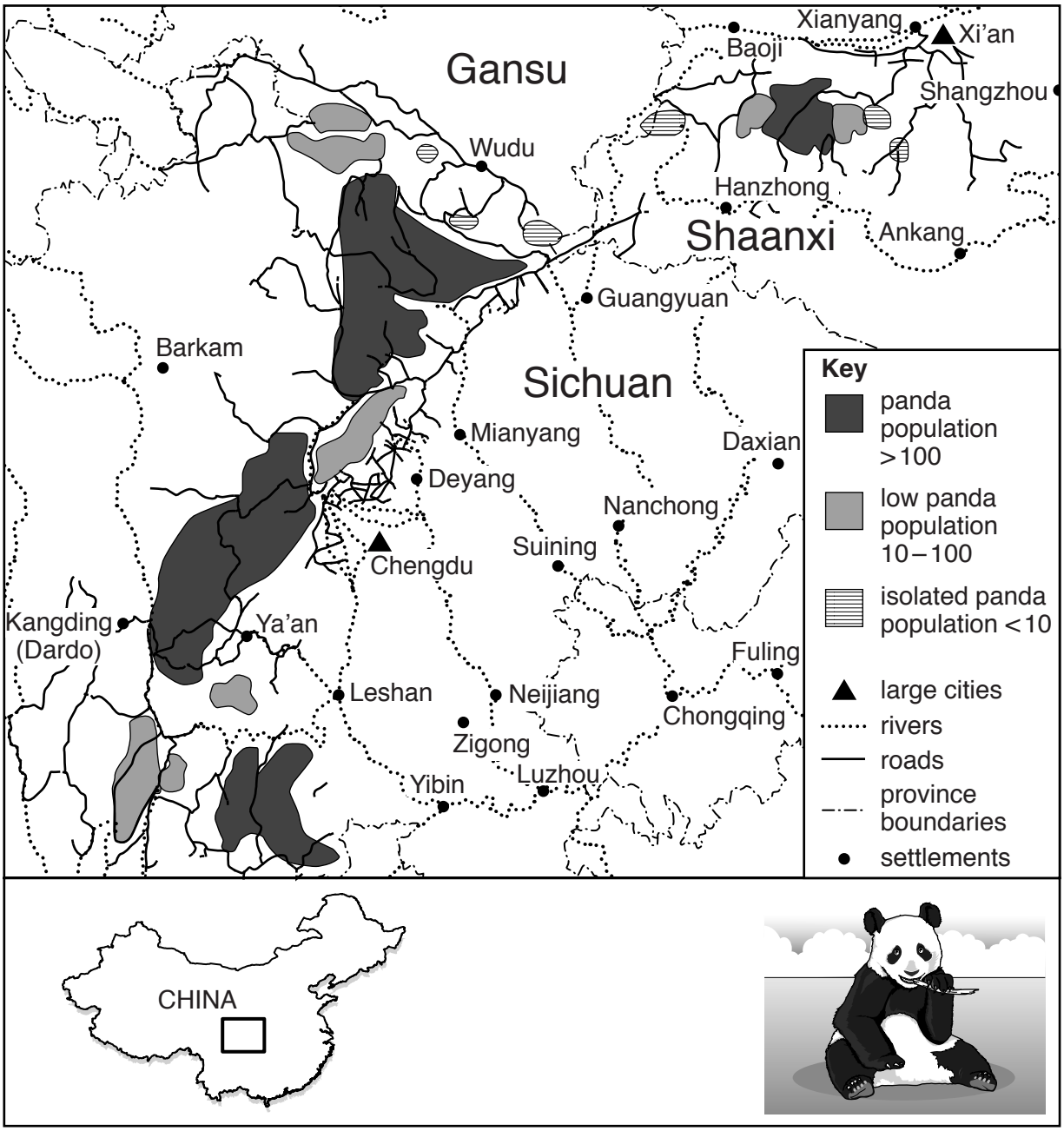

Fig. 3.1

(a) With reference to Fig. 3.1, suggest why giant pandas are a critically endangered species. [10]

(b) With reference to examples with which you are familiar, compare and evaluate the success of methods for the preservation and conservation of species and habitats. [30]

[Total: 40]

4 Fig. 4.1 shows historic and predicted trends in global water consumption from 1940 to 2030 for different regions of the world.

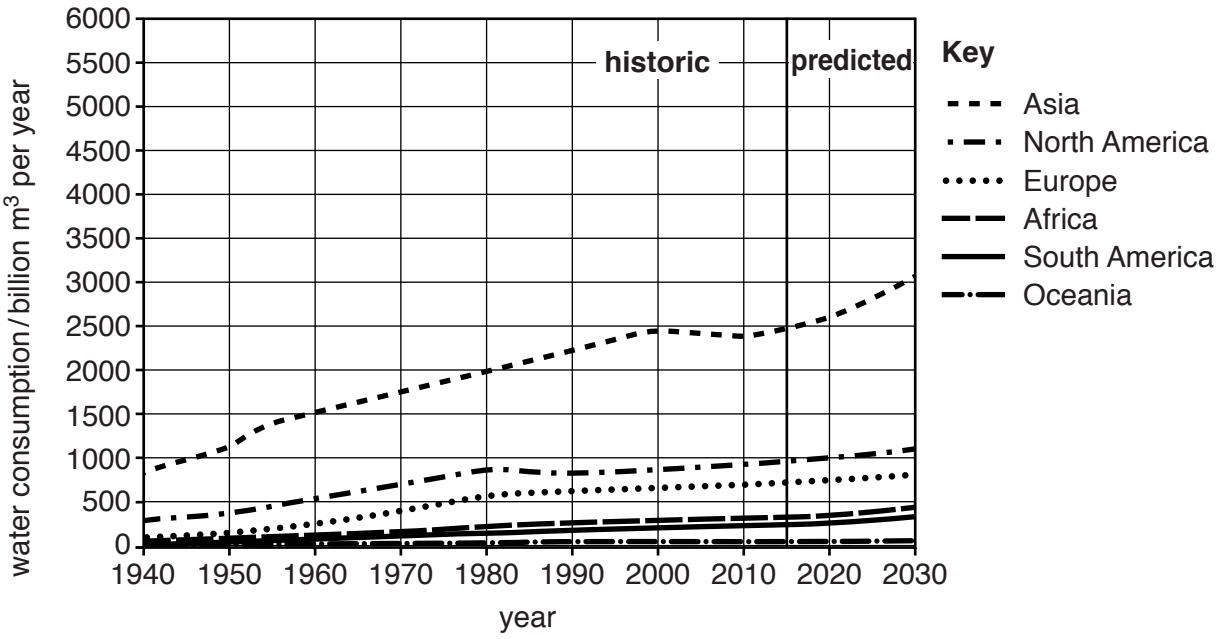

Fig. 4.1

(a) With reference to Fig. 4.1, outline **three** reasons for the historic and predicted increase in regional water consumption. [10]

(b) With reference to examples with which you are familiar at both local and regional scale, describe the different ways in which water is supplied. Assess to what extent these ways ensure that water supply continues to meet increasing demand. [30]

[Total: 40]

5 Fig. 5.1 shows global population growth since 1950 for three different population projections.

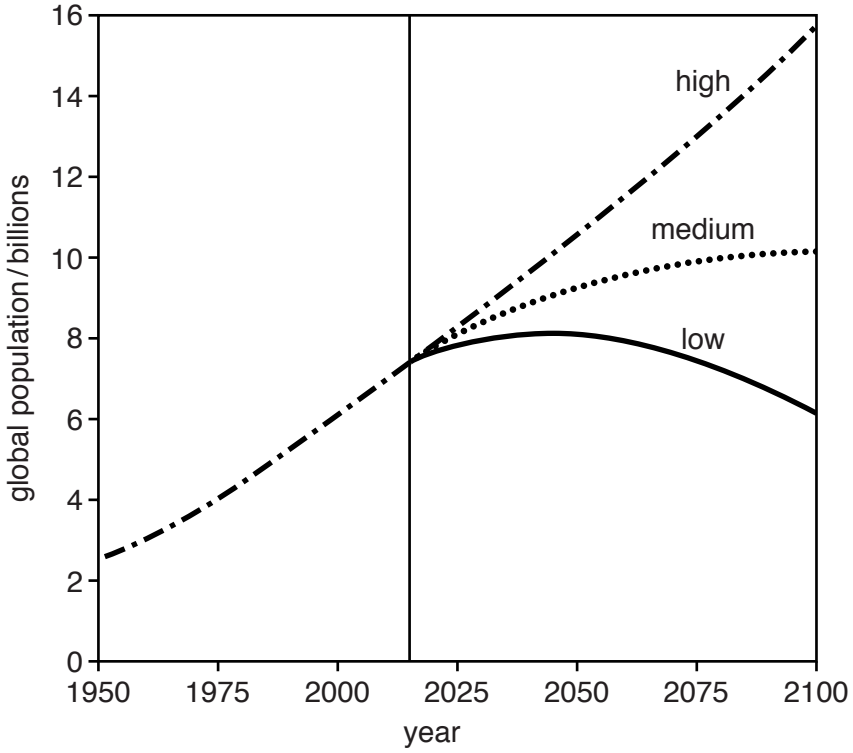

Fig. 5. 1

(a) With reference to Fig. 5.1, describe how changes to birth rates and death rates would contribute to each of the population growth projections. [10]

(b) With reference to MEDCs and LEDCs with which you are familiar, assess to what extent a population can be managed through policies which influence birth rates. [30]

[Total: 40]

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