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Diploma Programme
Programme du diplôme
Programa del Diploma

Environmental systems and societies
Standard level
Paper 2

Monday 2 November 2020 (morning)

Candidate session number

2 hours

Instructions to candidates

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all questions.
- Section B: answer two questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is **[65 marks]**.

23 pages

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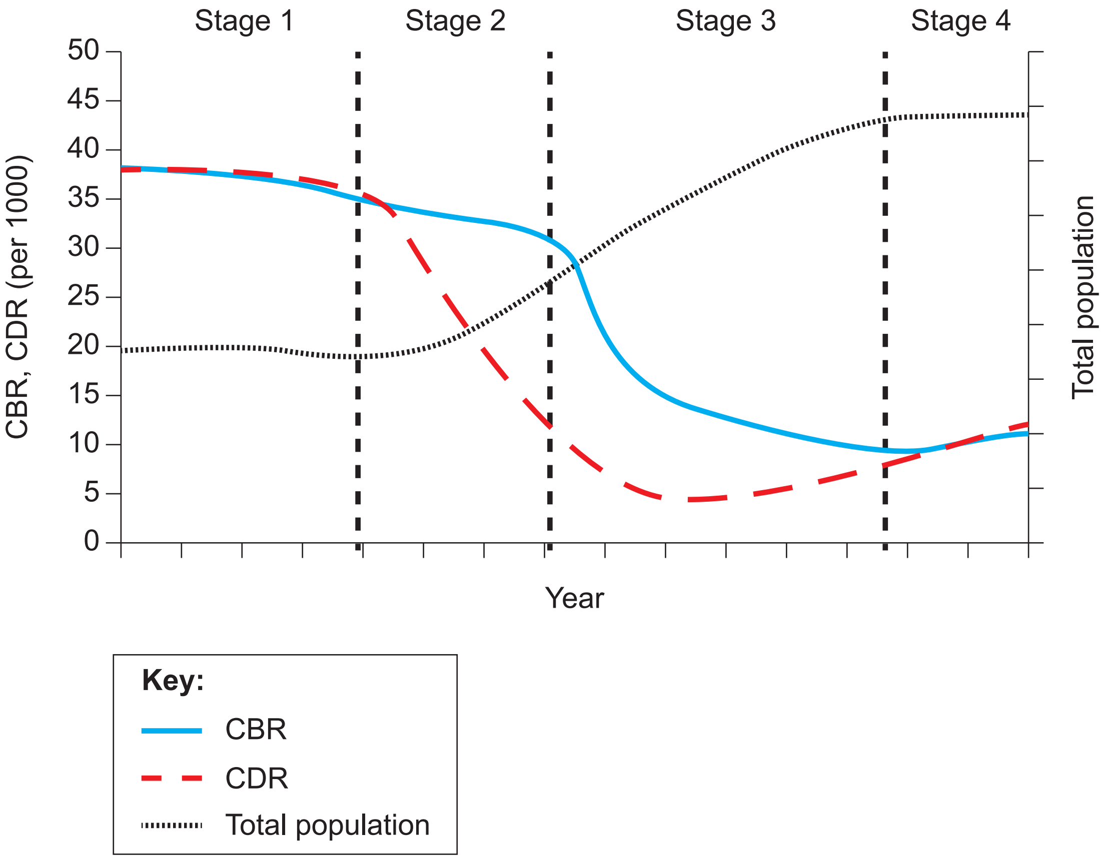
Section A

Answer **all** questions. Answers must be written within the answer boxes provided.

Figure 1: Demographic transition model



1. (a) Costa Rica has a crude birth rate (CBR) of 15.3 and a crude death rate (CDR) of 4.8.

(i) Identify the stage in which Costa Rica would be placed on the demographic transition model shown in **Figure 1**. [1]

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(ii) Calculate the natural increase rate (NIR) for Costa Rica. [1]

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(This question continues on the following page)

(Question 1 continued)

(iii) Calculate the doubling time for Costa Rica. [1]

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(b) Outline **one** strength and **one** limitation of the demographic transition model. [2]

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(c) Outline the socioeconomic factors that may cause a society to move from Stage 2 to Stage 3 on the demographic transition model. [3]

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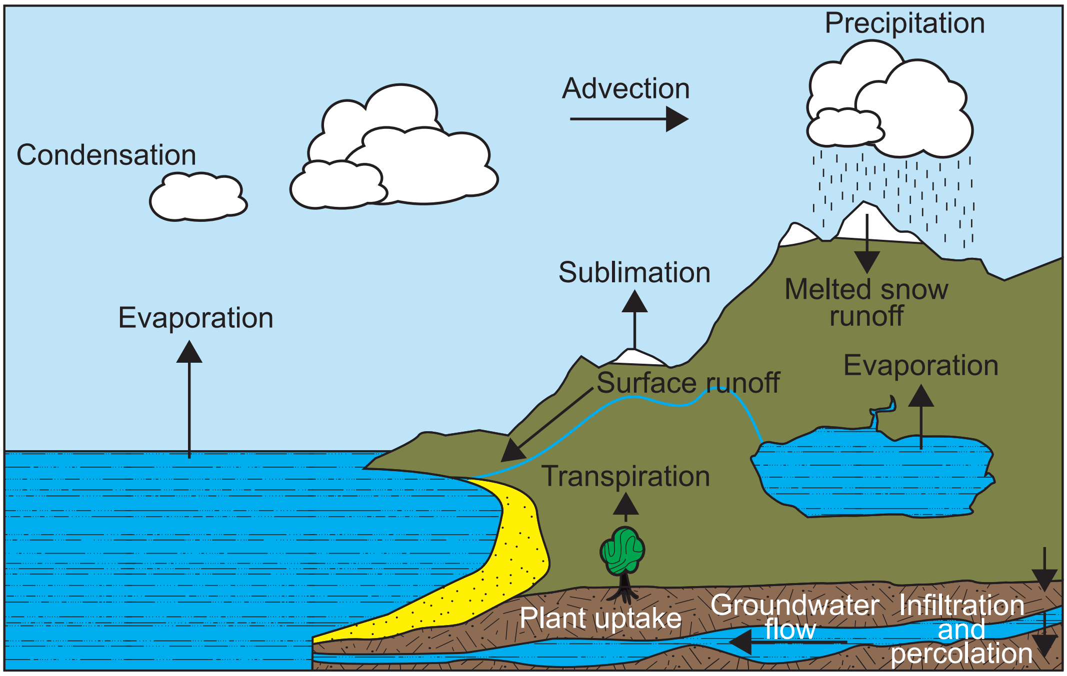
Figure 2: Representation of the water cycle



2. (a) (i) Identify **one** transfer and **one** transformation process shown in **Figure 2**. [2]

Transfer: . . . .

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Transformation: . . . .

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(ii) Outline how urbanization might impact **two** of the storages in **Figure 2**. [2]

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(This question continues on the following page)

(Question 2 continued)

(b) Runoff from agricultural land can result in excess nutrients entering water bodies.

(i) Outline **one** indirect measure of organic pollution. [3]

(ii) State **one** management strategy that could control the release of agricultural runoff. [1]

Figure 3: Examples of entanglement of marine species

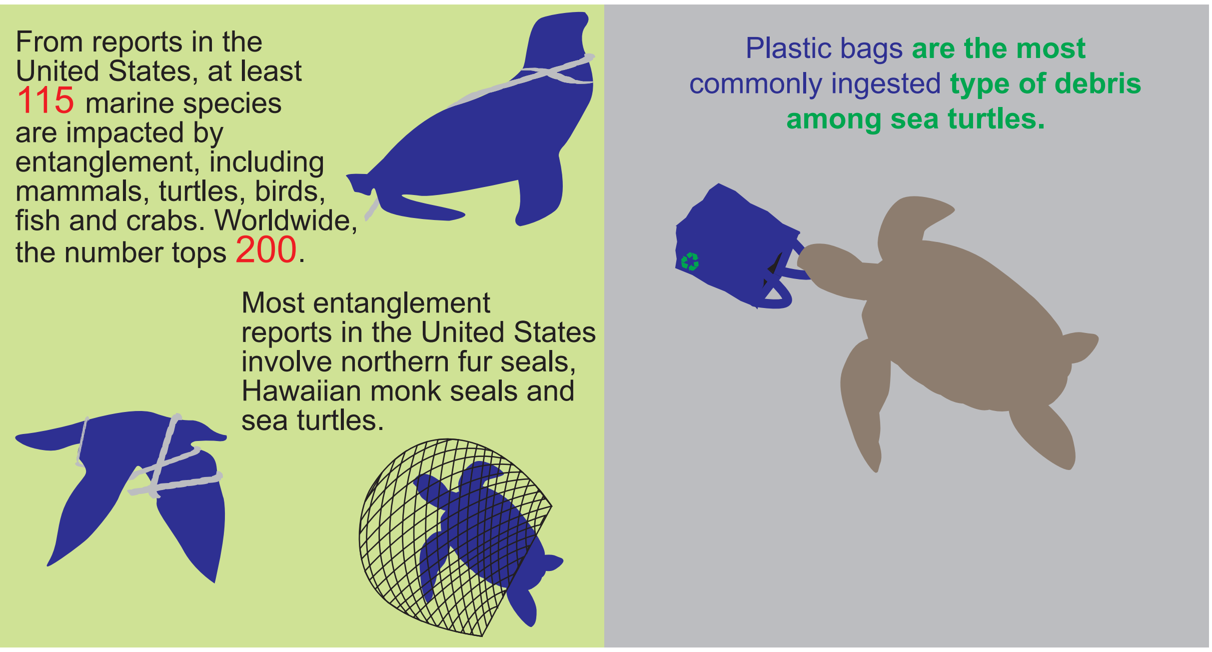

Figure 4: Sea turtle species and their status from the IUCN Red List

Species	Status
Leatherback	Vulnerable
Flatback	Data deficient
Kemp’s ridley	Critically endangered
Olive ridley	Vulnerable
Green	Endangered
Hawksbill	Critically endangered
Loggerhead	Vulnerable

3. (a) Calculate the percentage of sea turtle species from **Figure 4** that are critically endangered. [1]

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(This question continues on the following page)

(Question 3 continued)

(b) State **two** factors that are used to determine the conservation status of a species. [2]

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(c) Identify **two** strategies for fisheries management that could improve the conservation status of sea turtles. [2]

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(d) Discuss how solid domestic waste disposal options could be used to reduce the threats to marine organisms. [4]

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Section B

Answer **two** questions. Answers must be written within the answer boxes provided.

4. (a) Distinguish between **two** named biomes and the factors that cause their distribution. [4]

(b) Evaluate **one** method for measuring primary productivity in a named ecosystem. [7]

(c) Discuss how human activities impact the flows and stores in the nitrogen cycle. [9]

5. (a) Outline how a positive feedback loop can impact an ecosystem. [4]

(b) Compare and contrast the impact of **two** named food production systems on climate change. [7]

(c) To what extent does the development of different societies impact their choice of mitigation and adaptation strategies for climate change? [9]

6. (a) Outline **two** factors that enable a human population to increase its local carrying capacity. [4]

(b) Explain how the growth in human population can affect local and regional water resources. [7]

(c) To what extent would different environmental value systems be successful in reducing a society's ecological footprint? [9]

7. (a) Outline **two** factors that affect the frequency and severity of photochemical smog in an area. [4]

(b) Evaluate strategies to manage regional acid deposition using the pollution management model. [7]

(c) To what extent have international agreements been successful in solving atmospheric air pollution and climate change? [9]

References:

Figure 1 CIA, 2018. *World Factbook: Costa Rica*. Available at: https://www.cia.gov/library/publications/resources/the-world-factbook/geos/cs.html.

Figure 2 © International Baccalaureate Organization 2020.

Figure 3 NOAA.