

No part of this product may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without written permission from the IB.

Additionally, the license tied with this product prohibits commercial use of any selected files or extracts from this product. Use by third parties, including but not limited to publishers, private teachers, tutoring or study services, preparatory schools, vendors operating curriculum mapping services or teacher resource digital platforms and app developers, is not permitted and is subject to the IB's prior written consent via a license. More information on how to request a license can be obtained from <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

Aucune partie de ce produit ne peut être reproduite sous quelque forme ni par quelque moyen que ce soit, électronique ou mécanique, y compris des systèmes de stockage et de récupération d'informations, sans l'autorisation écrite de l'IB.

De plus, la licence associée à ce produit interdit toute utilisation commerciale de tout fichier ou extrait sélectionné dans ce produit. L'utilisation par des tiers, y compris, sans toutefois s'y limiter, des éditeurs, des professeurs particuliers, des services de tutorat ou d'aide aux études, des établissements de préparation à l'enseignement supérieur, des fournisseurs de services de planification des programmes d'études, des gestionnaires de plateformes pédagogiques en ligne, et des développeurs d'applications, n'est pas autorisée et est soumise au consentement écrit préalable de l'IB par l'intermédiaire d'une licence. Pour plus d'informations sur la procédure à suivre pour demander une licence, rendez-vous à l'adresse suivante : <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

No se podrá reproducir ninguna parte de este producto de ninguna forma ni por ningún medio electrónico o mecánico, incluidos los sistemas de almacenamiento y recuperación de información, sin que medie la autorización escrita del IB.

Además, la licencia vinculada a este producto prohíbe el uso con fines comerciales de todo archivo o fragmento seleccionado de este producto. El uso por parte de terceros —lo que incluye, a título enunciativo, editoriales, profesores particulares, servicios de apoyo académico o ayuda para el estudio, colegios preparatorios, desarrolladores de aplicaciones y entidades que presten servicios de planificación curricular u ofrezcan recursos para docentes mediante plataformas digitales— no está permitido y estará sujeto al otorgamiento previo de una licencia escrita por parte del IB. En este enlace encontrará más información sobre cómo solicitar una licencia: <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

**Environmental systems and societies**  
**Standard level**  
**Paper 2**

Monday 2 November 2020 (morning)

Candidate session number

--	--	--	--	--	--	--	--	--	--

2 hours

**Instructions to candidates**

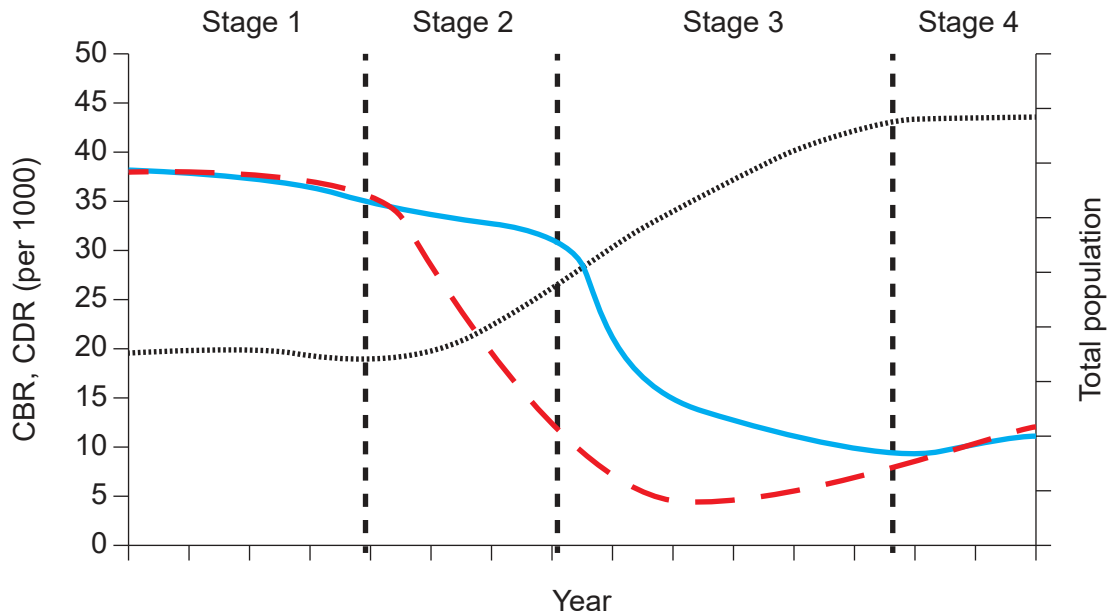
- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all questions.
- Section B: answer two questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark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



### Section A

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

**Figure 1: Demographic transition model**



**Key:**

- CBR
- - - CDR
- ..... Total population

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]

.....

.....

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

.....

.....

(This question continues on the following page)



24EP02

**(Question 1 continued)**

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

.....  
.....

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

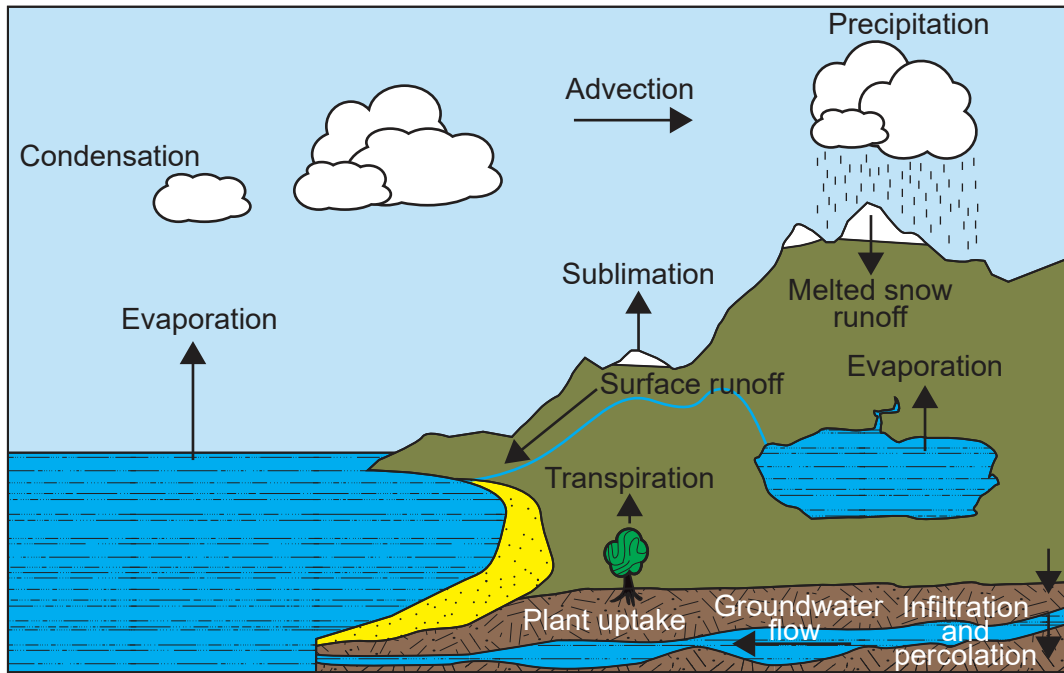
.....  
.....  
.....  
.....

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

.....  
.....  
.....  
.....  
.....  
.....



Figure 2: Representation of the water cycle



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

Transfer: .....

.....

Transformation: .....

.....

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

.....

.....

.....

.....

(This question continues on the following page)



24EP04

**(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]

.....

.....



24EP05

Turn over

Figure 3: Examples of entanglement of marine species

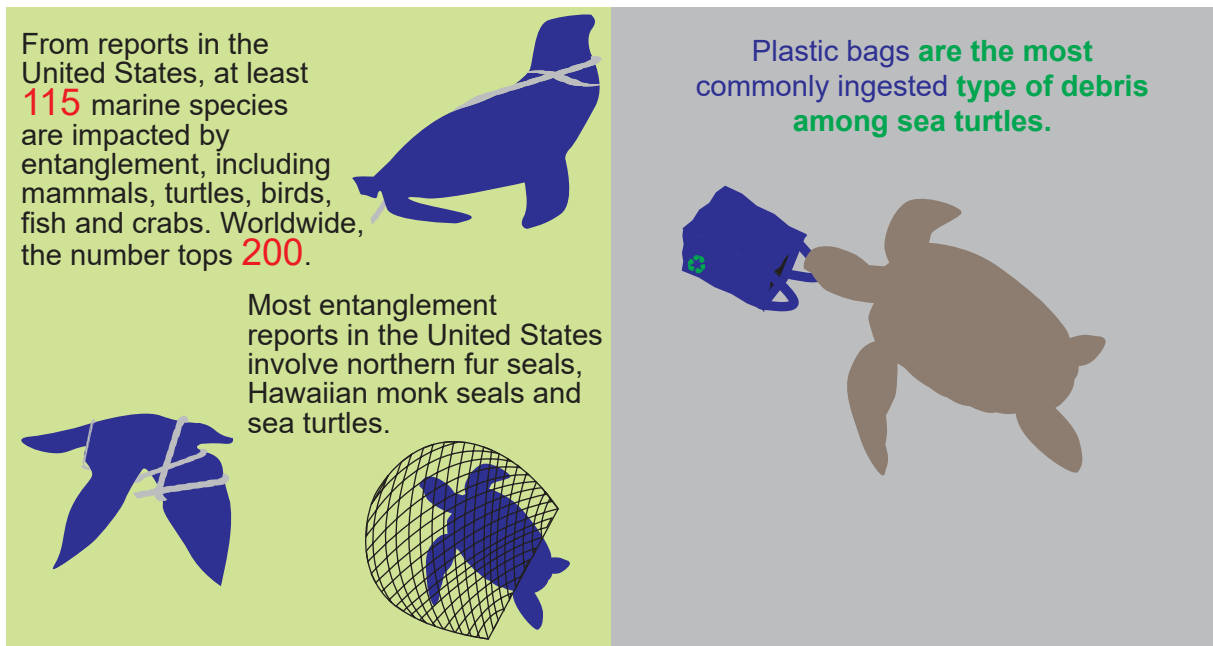


Figure 4: Sea turtle species and their status from the IUCN Red List

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]

.....

.....

(This question continues on the following page)



24EP06

**(Question 3 continued)**

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

.....

.....

.....

.....

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

.....

.....

.....

.....

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

.....

.....

.....

.....

.....

.....

.....

.....





## 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]



A large rectangular area containing 25 horizontal dotted lines for writing.



24EP09

Turn over

A large rectangular area containing 24 horizontal dotted lines for writing.



24EP10

A large rectangular area containing 25 horizontal dotted lines for writing.



24EP11

Turn over

A large rectangular area containing 24 horizontal dotted lines for writing.



24EP12

A large rectangular area containing 24 horizontal dotted lines for writing.



24EP13

Turn over

A large rectangular area containing 24 horizontal dotted lines for writing.



24EP14

A large rectangular area containing 25 horizontal dotted lines for writing.



24EP15

Turn over



A large rectangular area containing 24 horizontal dotted lines for writing.



24EP16

A large rectangular area containing 25 horizontal dotted lines for writing.



24EP17

Turn over

A large rectangular area containing 24 horizontal dotted lines, intended for writing.



24EP18

A large rectangular area containing 24 horizontal dotted lines for writing.



24EP19

Turn over

A large rectangular area containing 24 horizontal dotted lines for writing.



24EP20

A large rectangular area containing 24 horizontal dotted lines for writing.



24EP21

Turn over

A large rectangular area containing 24 horizontal dotted lines for writing.



24EP22

A large rectangular area containing 24 horizontal dotted lines, intended for writing.



24EP23



**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.



24EP24