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Diploma Programme
Programme du diplôme
Programa del Diploma

Environmental systems and societies
Standard level
Paper 2

5 May 2025

Zone A morning | **Zone B** morning | **Zone C** 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

2225–6612
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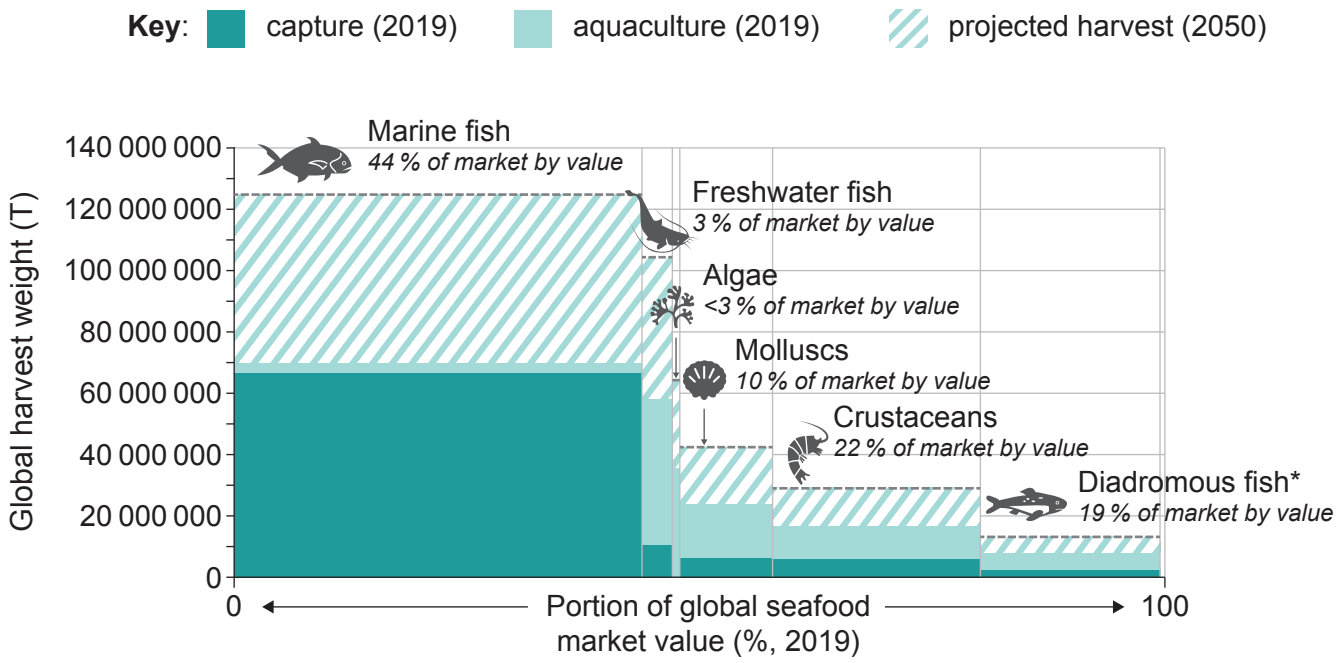
Section A

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

Figure 1: Global seafood harvests for 2019 and projected harvest for 2050



*fish which migrate between marine and freshwater

1. (a) Identify the category with the highest global harvest weight from aquaculture in **Figure 1**. [1]

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(b) (i) Using **Figure 1**, calculate the projected increase in the harvest of crustaceans between 2019 and 2050. [1]

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(ii) Outline **one** reason for the increase referred to in (b)(i). [1]

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(c) Describe **two** possible reasons for the difference in global aquaculture harvest between marine fish and crustaceans in **Figure 1**. [2]

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(d) Evaluate the use of aquaculture in meeting the projected harvest of global seafood, as shown in **Figure 1**. [4]

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Figure 2(a): Ozone concentration by altitude in the atmosphere

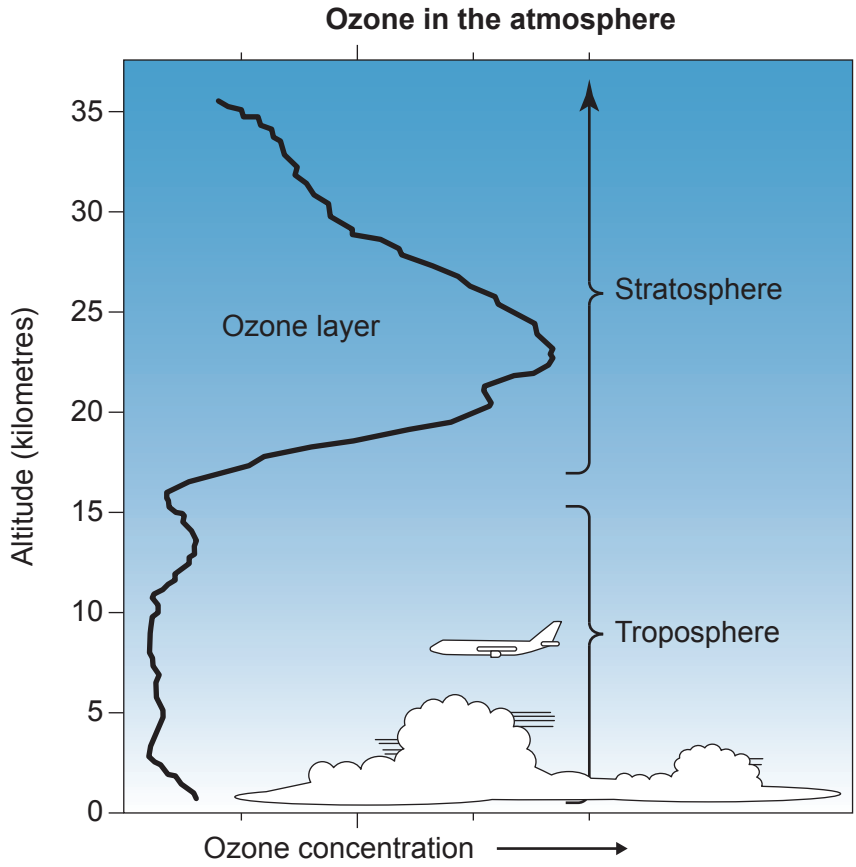
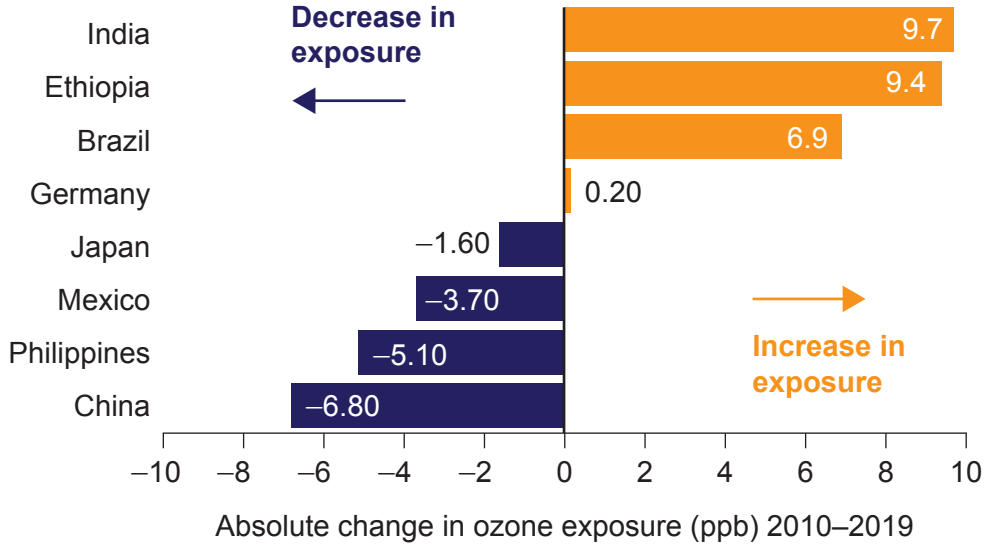


Figure 2(b): Percentage change in tropospheric ozone exposure 2010–2019



[Source: Reprinted with permission from Health Effects Institute 2020.]

2. (a) Identify the altitude with the highest concentration of ozone shown in **Figure 2(a)**. [1]

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(b) With reference to **Figure 2(a)**, describe the importance of a higher ozone concentration between 20 and 30 kilometres for living organisms. [2]

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(c) State **one** possible impact of increased ground-level ozone concentration on human health. [1]

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(d) Outline **two** possible reasons for the change in ozone exposure for India shown in **Figure 2(b)**. [2]

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(e) Outline **two** possible ways countries can reduce their tropospheric ozone exposure, as shown in **Figure 2(b)**. [2]

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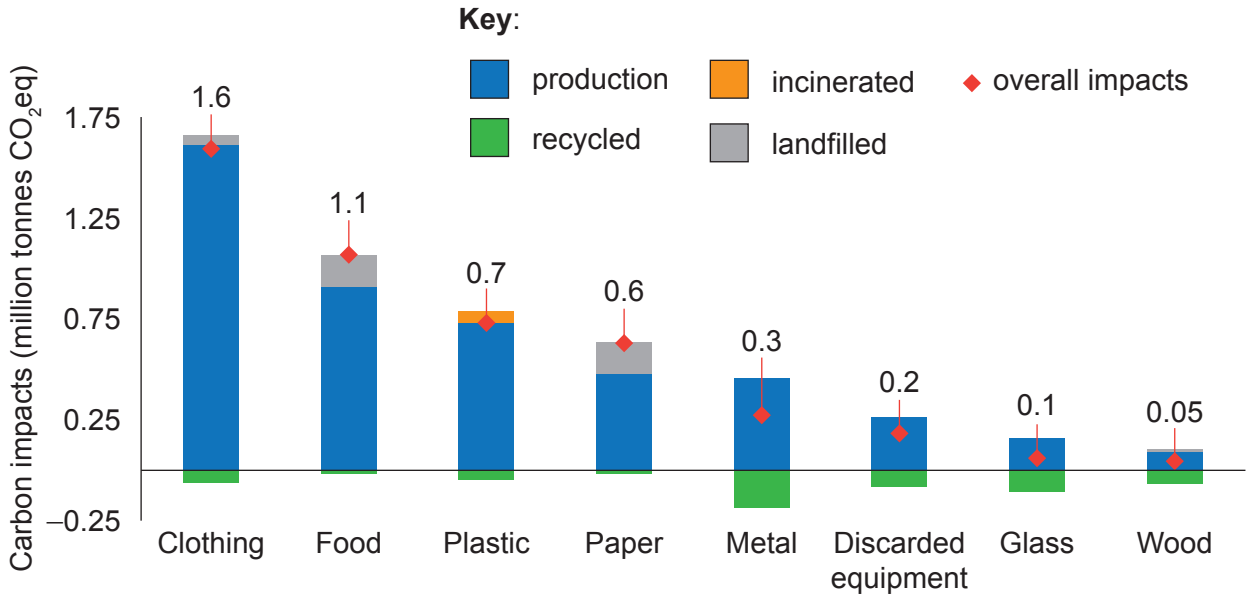
2225–6612

Figure 3: Total carbon impacts of Scotland's 2018 household waste



3. (a) Identify the household waste category with the lowest carbon impact from production in **Figure 3**. [1]

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(b) Describe **one** possible reason why paper waste has double the overall carbon impact than that of metal waste in **Figure 3**. [1]

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(c) Outline **two** disadvantages of using landfill to dispose of paper, as shown in **Figure 3**. [2]

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(d) Outline **two** disadvantages of recycling metal as an approach to decreasing carbon impacts, as shown in **Figure 3**. [2]

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(e) Suggest **two** pollution management strategies that could be used to decrease the carbon impacts from food waste in Scotland. [2]

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Section B

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

4. (a) Identify **four** characteristic features of the tropical rainforest biome. [4]

(b) Explain how a community of decomposers contributes to the stability of the whole ecosystem. [7]

(c) To what extent is a technocentric value system more appropriate than other value systems in addressing issues of sustainability? [9]

5. (a) Outline **four** important functions of water in natural ecosystems. [4]

(b) Describe methods that could be used to measure the population of water snails in a pond. [7]

(c) With reference to named examples, to what extent might the design and management of conservation areas contribute to their success? [9]

6. (a) Outline **four** advantages for a country changing from fossil fuels to renewable sources of energy. [4]

(b) Evaluate **two** strategies for preventing eutrophication. [7]

(c) Steady state equilibrium is a concept relevant to many systems. Justify its usefulness in understanding the sustainability of named systems. [9]

7. (a) Outline the similarities and differences between *crude birth rate* and *natural increase rate*. [4]

(b) Evaluate water taxation and grey-water recycling as a means of sustainably managing water supply. [7]

(c) To what extent can population policies lead to a stable human population? [9]

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References:

Figure 1 Graphic with permission from Rob Pettit (NewSeas), based on underlying 2019 production and value data from FAO FishStat.

Figure 2(a) Langematz, U. Stratospheric ozone: down and up through the anthropocene. *ChemTexts* 5, 8 (2019). https://doi.org/10.1007/s40828-019-0082-7. Open access article distributed under the terms of the Creative Commons CC BY 4.0 license http://creativecommons.org/licenses/by/4.0/. Source adapted (redrawn and simplified).

Figure 2(b) Health Effects Institute. 2020. *State of Global Air 2020. Special Report*. Boston, MA: Health Effects Institute.

Figure 3 Salemdeeb, R., Saint, R., Pomponi, F., Pratt, K. & Lenaghan, M., 2022. Beyond recycling: An LCA-based decision-support tool to accelerate Scotland's transition to a circular economy. *Resources, Conservation & Recycling Advances*. https://www.sciencedirect.com/science/article/pii/S2667378922000074. Licensed under CC BY 4.0 https://creativecommons.org/licenses/by/4.0/. Source adapted.