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Environmental systems and societies
Standard level
Paper 2

Friday 6 May 2022 (morning)

Candidate session number

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2 hours

Instructions to candidates

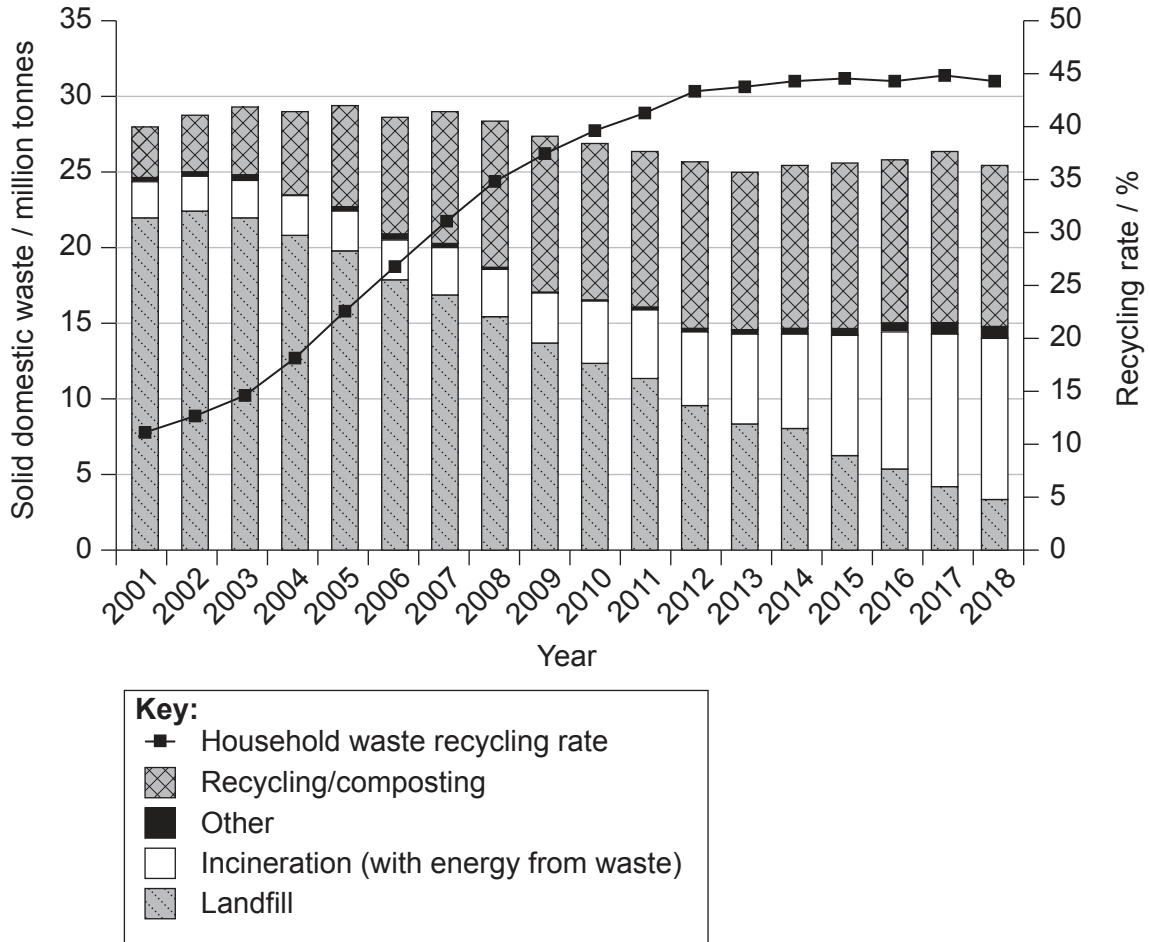
- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all questions.
- Section B: answer two questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark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



Section A

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

Figure 1: Management of solid domestic waste in England, 2001–2018



1. (a) With reference to **Figure 1**, identify the recycling rate in England in 2018. [1]

.....

.....

(b) Outline **one** reason for the shape of the recycling rate curve from 2013 to 2018. [1]

.....

.....

(This question continues on the following page)



24EP02

(Question 1 continued)

- (c) Estimate the reduction in solid domestic waste (in million tonnes) going to landfill from 2001 to 2018.

[1]

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- (d) Describe **three** reasons why the proportion of solid domestic waste being recycled/ composted and incinerated has changed.

[3]

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- (e) Outline **one** reason why there has been an overall change in recorded total solid domestic waste between 2001 and 2018.

[1]

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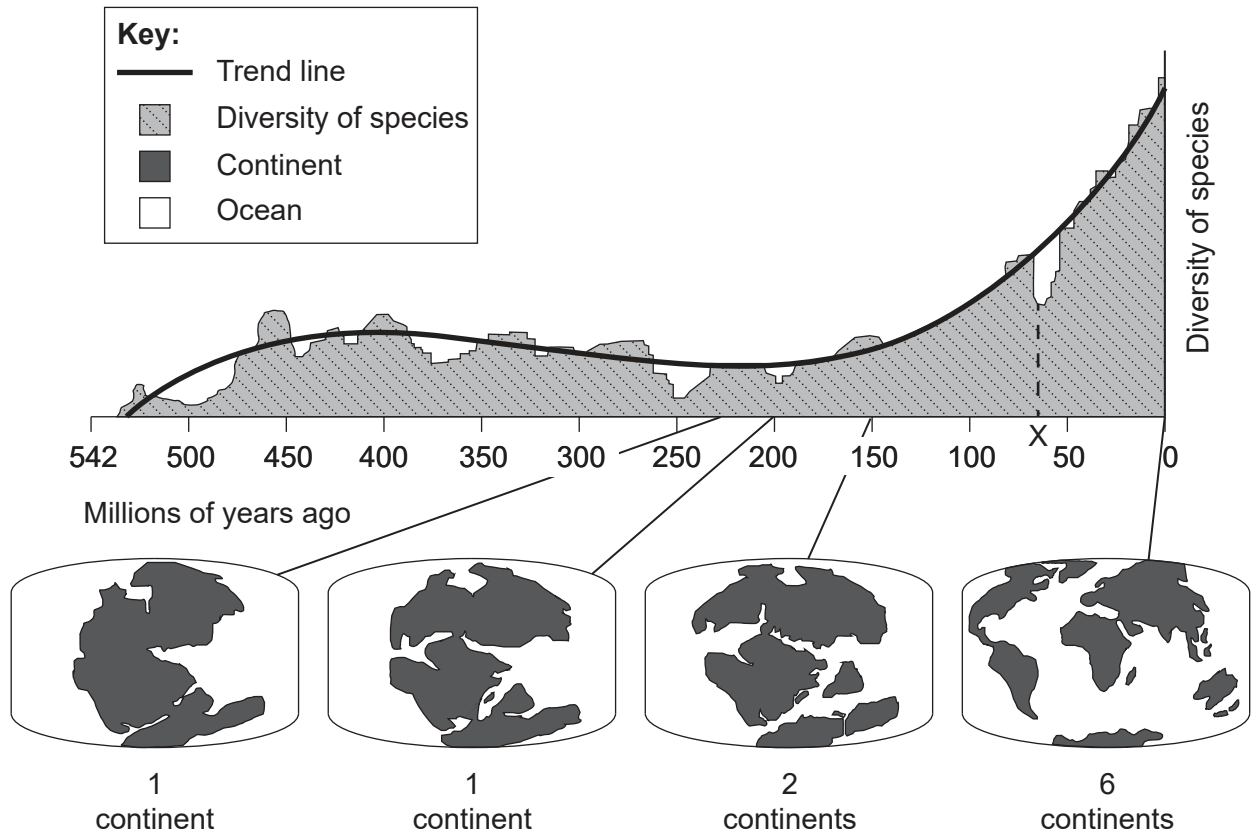
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24EP03

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Figure 2: Distribution of continents and diversity of species over time



2. (a) (i) With reference to **Figure 2**, identify when the diversity of species was lowest in the past 400 million years. [1]

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(ii) Describe what may have caused the deviation from the trend line at point X in **Figure 2**. [2]

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(This question continues on the following page)



24EP04

(Question 2 continued)

- (b) (i) Identify the relationship between the number of continents and the diversity of species during the past 250 million years. [1]

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- (ii) Describe **two** reasons why there is a relationship between the number of continents and the diversity of species. [2]

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- (c) Outline the role of natural selection in increasing the diversity of species. [2]

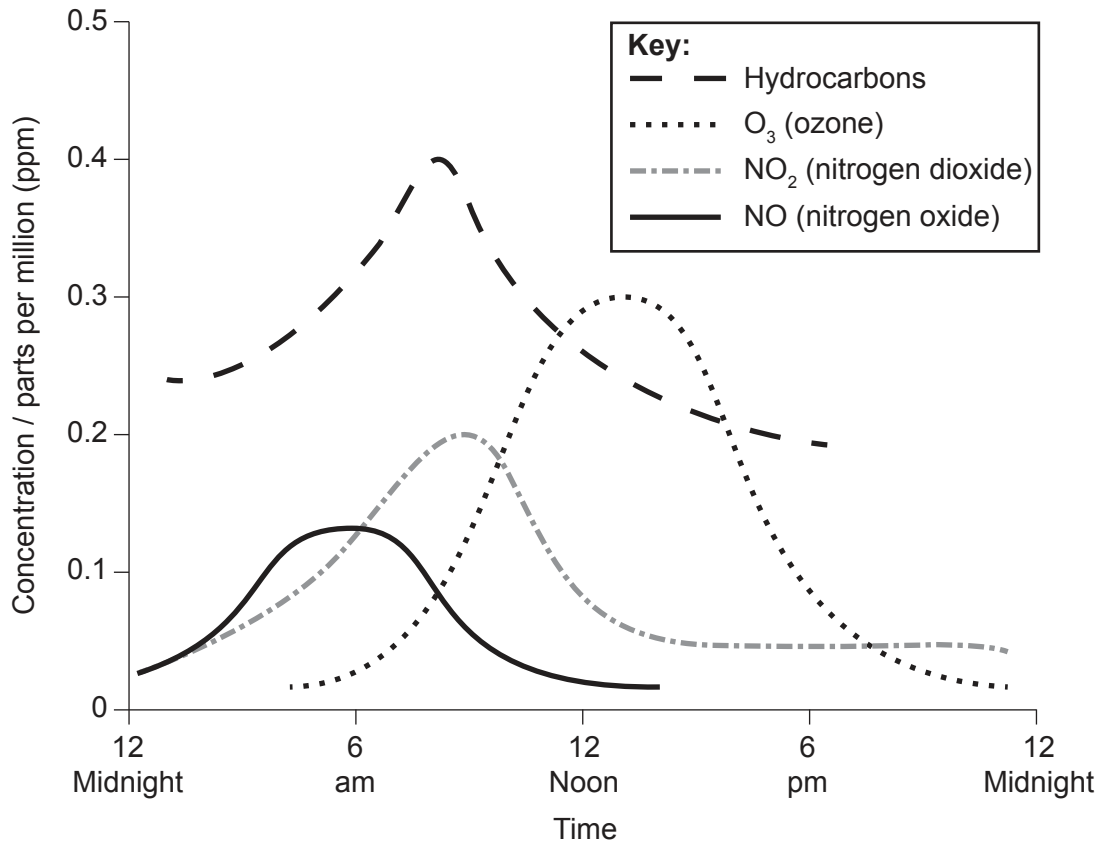
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24EP05

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Figure 3: Concentration of atmospheric pollutants associated with photochemical smog



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3. (a) (i) Identify **one** primary pollutant from the pollutants shown in **Figure 3**. [1]

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.....

(ii) Outline why the pollutant named in Question 3 (a)(i) is referred to as a primary pollutant. [1]

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(b) Outline **one** reason why there is an increase in nitrogen oxides and hydrocarbons early in the day. [1]

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(This question continues on the following page)



24EP06

(Question 3 continued)

(c) Explain the changes in ozone concentration over the period shown in **Figure 3**. [3]

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(d) State **one** environmental impact of the accumulation of ozone shown in **Figure 3**. [1]

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(e) Outline **two** local conditions that may increase the severity of photochemical smog. [2]

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(f) Outline the role of catalytic converters in reducing photochemical smog. [1]

.....

.....



Section B

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

4. (a) Outline how species diversity and population size influence the resilience of an ecosystem. [4]
- (b) Describe the similarities and differences in using a biotic index and a diversity index to assess ecosystems. [7]
- (c) With reference to named examples, discuss the significance of diversity in the sustainability of food production systems. [9]
5. (a) Outline the role of the atmospheric system in the distribution of biomes. [4]
- (b) Explain how human impacts on the atmosphere may influence the productivity of terrestrial biomes. [7]
- (c) To what extent is the need for conservation more significant in tropical biomes? [9]
6. (a) Outline **four** ways in which urbanization may influence processes in the hydrological cycle. [4]
- (b) Hydropower is a resource that can be exploited from rivers. Explain how the value of this resource to a society may vary over time. [7]
- (c) To what extent are water scarcity issues better addressed through changing human behaviour than through technological development? [9]
7. (a) Outline the processes involved in the formation of fertile soils from bare rock. [4]
- (b) Explain how negative and positive feedback mechanisms may influence the growth of decomposer populations in the soil. [7]
- (c) To what extent are natural limiting factors more likely than population policies to limit global human population growth in the future? [9]



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24EP23

References:

- Figure 1** *Statistics on waste managed by local authorities in England in 2017/18*, Department for Environment, Food and Rural Affairs. Source adapted.
- Figure 2** Biodiversity (in thousands of genera) since the Cambrian explosion of evolution, https://commons.wikimedia.org/wiki/File:Phanerozoic_Biodiversity.svg. This file is licensed under the Creative Commons Attribution-Share Alike 3.0 Unported license. (CC BY-SA 3.0) <https://creativecommons.org/licenses/by-sa/3.0/deed.en>.
- USGS (United States Geological Survey) maps at <https://pubs.usgs.gov/gip/dynamic/historical.html>
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