

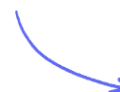
DP . IB . Environmental Systems & Societies ⌚ 2 hours 30minutes ? 6 questions

## Practice Paper 2 (HL)

### Instructions to Candidates:

- Answer all questions.
- Refer to the resource booklet which accompanies this question paper.
- A calculator is required for this paper.

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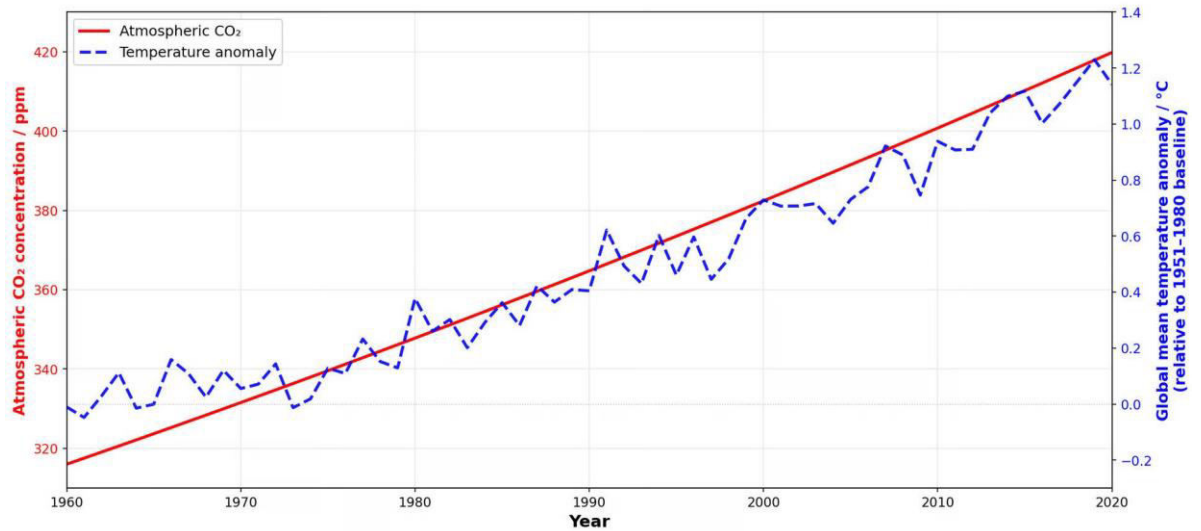
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**Total Marks** /80

1 (a)

Section A

Figure 1: Atmospheric CO<sub>2</sub> concentration and global mean temperature anomaly from 1960 to 2020



Describe the overall trend in atmospheric CO<sub>2</sub> concentration shown in **Figure 1** from 1960 to 2020, including any notable pattern within the trend.

.....  
..... (2 marks)

(b) Explain how increasing atmospheric CO<sub>2</sub> could act as a positive feedback in the global climate system.

.....  
..... (3 marks)

(c) Outline **one** natural factor that causes regular seasonal oscillations in CO<sub>2</sub> concentration.

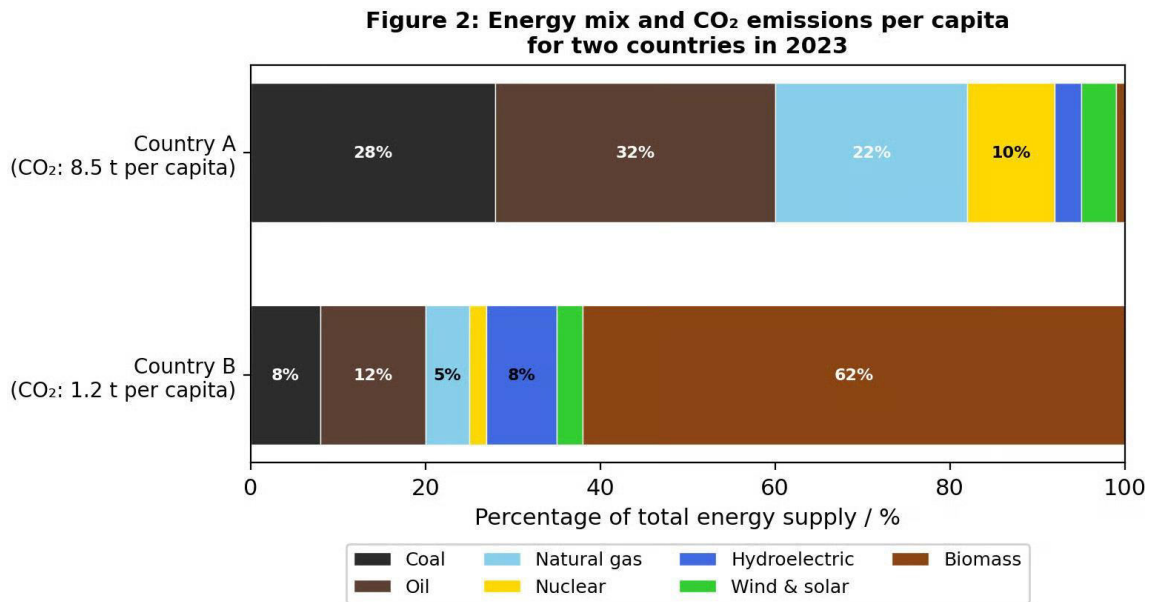
..... (1 mark)

(d) State one anthropogenic activity that has directly contributed to the trend in CO<sub>2</sub> shown in Figure 1.

..... (1 mark)



2 (a)



Using **Figure 2**, calculate the percentage of Country A's total energy supply that comes from fossil fuels.

.....(1 mark)

(b) Suggest **one** reason why Country B has a much higher percentage of energy from biomass than Country A.

.....(1 mark)

(c) Distinguish between the energy mix of Country A and Country B.

.....  
.....(2 marks)

(d) Outline **two** reasons why Country A has higher CO<sub>2</sub> emissions per capita than Country B.

.....  
.....(2 marks)

(e) Suggest **one** way Country A could reduce its CO<sub>2</sub> emissions from energy production.

.....(1 mark)

3 (a)

**Figure 3(a): Species abundance data for two coral reef sites**

Species	Healthy reef (Site A) No. of individuals	Degraded reef (Site B) No. of individuals
Hard coral	45	8
Soft coral	38	5
Parrotfish	32	12
Clownfish	28	3
Sea urchin	35	52
Crown-of-thorns starfish	22	70
<b>Total</b>	<b>200</b>	<b>150</b>

State which site has greater species evenness.

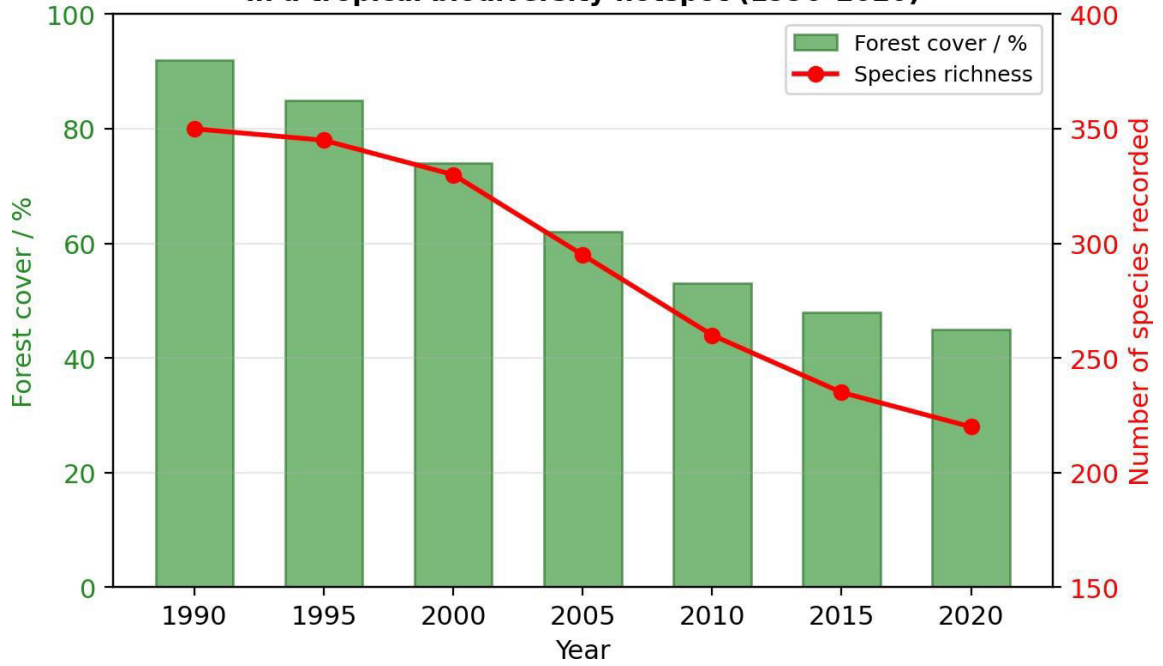
.....(1 mark)

(b) Using the data, explain why Site A would have a higher Simpson's diversity index than Site B.

.....  
.....  
.....(3 marks)

(c)

**Figure 3(b): Changes in forest cover and recorded species richness in a tropical biodiversity hotspot (1990-2020)**



Outline the overall trend in forest cover over time shown in **Figure 3(b)**.

.....(1 mark)

(d) Describe the relationship between forest cover and species richness shown in **Figure 3(b)**.

.....(2 marks)

(e) Suggest **one** reason why there may be a time lag between forest loss and species decline.

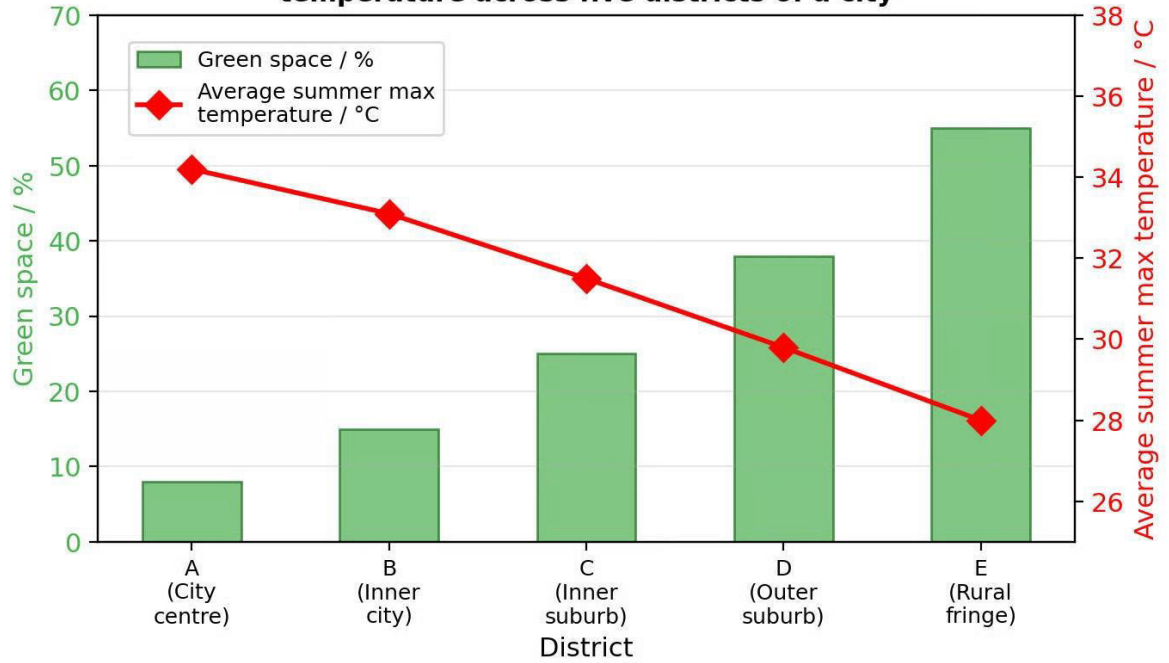
.....(1 mark)

(f) Explain how habitat destruction in tropical biodiversity hotspots could affect ecosystem resilience.

.....(3 marks)

4 (a)

**Figure 4(a): Percentage green space and average summer maximum temperature across five districts of a city**



State the relationship between percentage of green space and average summer maximum temperature.

.....(1 mark)

(b) Suggest **two** reasons for this relationship.

.....(2 marks)

(c) **Figure 4(b): Environmental and health data across five districts of a city**

District	Population density (people km <sup>-2</sup> )	Air quality index (PM <sub>2.5</sub> µg m <sup>-3</sup> )	Heat-related hospital admissions (per 10 000)	Average household income / \$
A (City centre)	12 500	38	14.2	32 000
B (Inner city)	9 800	32	11.8	41 000
C (Inner suburb)	5 200	22	7.3	58 000
D (Outer suburb)	2 100	15	4.1	72 000
E (Rural fringe)	450	9	2.0	65 000

Using **Figure 4(b)** describe **two** environmental or health impacts experienced by residents in District A compared to District E.

.....  
..... (2 marks)

(d) Discuss the extent to which sustainable urban planning strategies can reduce the urban heat island effect and its associated impacts.

.....  
.....  
.....  
.....  
..... (5 marks)



.....  
.....  
..... (9 marks)



