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Environmental systems and societies
Standard level
Paper 1

27 October 2023

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

Candidate session number

1 hour

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Instructions to candidates

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all questions. Refer to the resource booklet which accompanies this question paper.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is **[35 marks]**.



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

1. (a) With reference to **Figure 2(b)**, outline **one** difference between the climates of Crescent City and Desert Center. [1]

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- (b) With reference to **Figures 2(b)** and **2(c)**, state the biome found around Crescent City. [1]

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2. (a) Using **Figure 3** and the identification key below, identify species **A** and species **B**. [2]

1.	Are the leaves/needles spiky?	Yes	Species A
		No	Go to question 2
2.	Are the leaves/needles scaly?	Yes	Giant sequoia (<i>Sequoiadendron giganteum</i>)
		No	Go to question 3
3.	Are there small seed cones at the end of the stem?	Yes	Coast redwood (<i>Sequoia sempervirens</i>)
		No	Species B

Species A:

.....

Species B:

.....

(This question continues on the following page)



(Question 2 continued)

- (b) With reference to **Figures 4(b)** and **4(c)**, state the species interaction between the giant sequoia (*Sequoiadendron giganteum*) and the long-horned beetle (*Phymatodes nitidus*). [1]

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- (c) State **one** value of the giant sequoia (*Sequoiadendron giganteum*). [1]

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- (d) With reference to **Figures 4(a)** and **4(d)**, identify **one** reason why the giant sequoia (*Sequoiadendron giganteum*) is listed as endangered in the *International Union of Conservation of Nature (IUCN) Red List of Threatened Species*. [1]

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3. (a) State the trend in number of individual wildfires in **Figure 5(b)**. [1]

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- (b) With reference to **Figures 5(a)** and **5(b)**, suggest why the area burnt in 2020 was greater than the area burnt in 2013. [1]

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- (c) Explain how wildfires act as a positive feedback mechanism for global warming. [3]

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- (d) Describe the process of succession after a wildfire has occurred in the forest. [3]

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4. (a) With reference to **Figures 6(a)** and **6(b)**, identify **one** conflict over freshwater resources in California. [1]

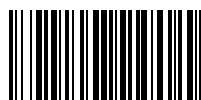
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- (b) With reference to **Figure 6(c)**, outline **two** ways in which individuals in California could meet the 2030 target for indoor daily water use. [2]

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- (c) Using **Figure 6(c)**, calculate the percentage decrease in mean daily water use per person between 1990 and 2020. [1]

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5. (a) With reference to **Figure 7(b)**, state the relationship between irrigation water salinity and crop yield potential.

[1]

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- (b) Explain how irrigation has reduced soil fertility in the Central Valley.

[3]

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- (c) Evaluate **one** strategy that almond farmers in the Central Valley could use to increase sustainability.

[4]

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6. Outline **two** factors that have influenced the choice of energy sources adopted by California, as shown in **Figure 8(b)**.

[2]

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- [6]



