

FORM TP 2017204



TEST CODE **02120020**

MAY/JUNE 2017

**CARIBBEAN EXAMINATIONS COUNCIL
CARIBBEAN ADVANCED PROFICIENCY EXAMINATION®**

ENVIRONMENTAL SCIENCE

ECOLOGY, PEOPLE AND NATURAL RESOURCE USE

UNIT 1 – Paper 02

2 hours 30 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in THREE sections. Answer ALL questions.
2. Write your answers in the spaces provided in this booklet.
3. Do NOT write in the margins.
4. You may use a silent, non-programmable calculator to answer questions.
5. You are advised to take some time to read through the paper and plan your answers.
6. If you need to rewrite any answer and there is not enough space to do so on the original page, you must use the extra lined page(s) provided at the back of this booklet. **Remember to draw a line through your original answer.**
7. **If you use the extra page(s) you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.**

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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MODULE 1

Answer BOTH questions.

1. (a) Define the term 'ecological niche'.

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[1 mark]

- (b) The law of competitive exclusion states that no two species will occupy the same niche and compete for the same resources. Figure 1 illustrates the niches for Species A and Species B.

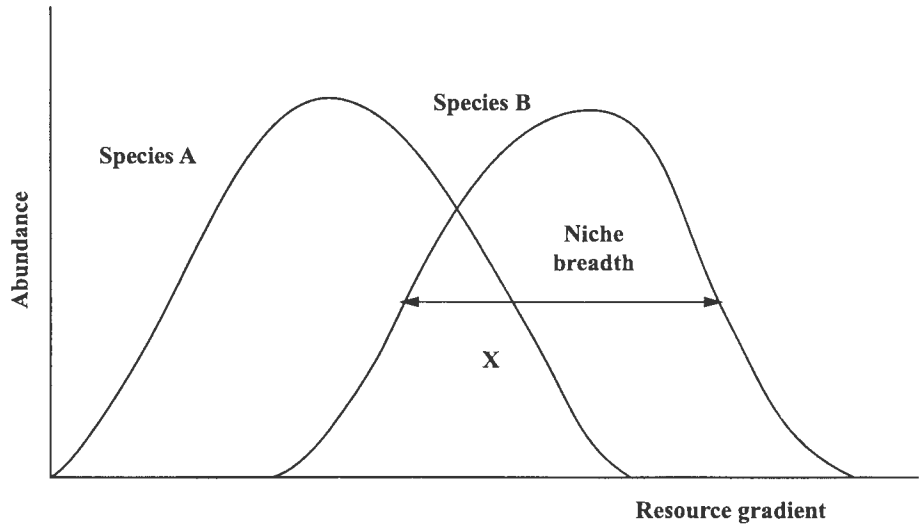


Figure 1. Niches for species A and species B

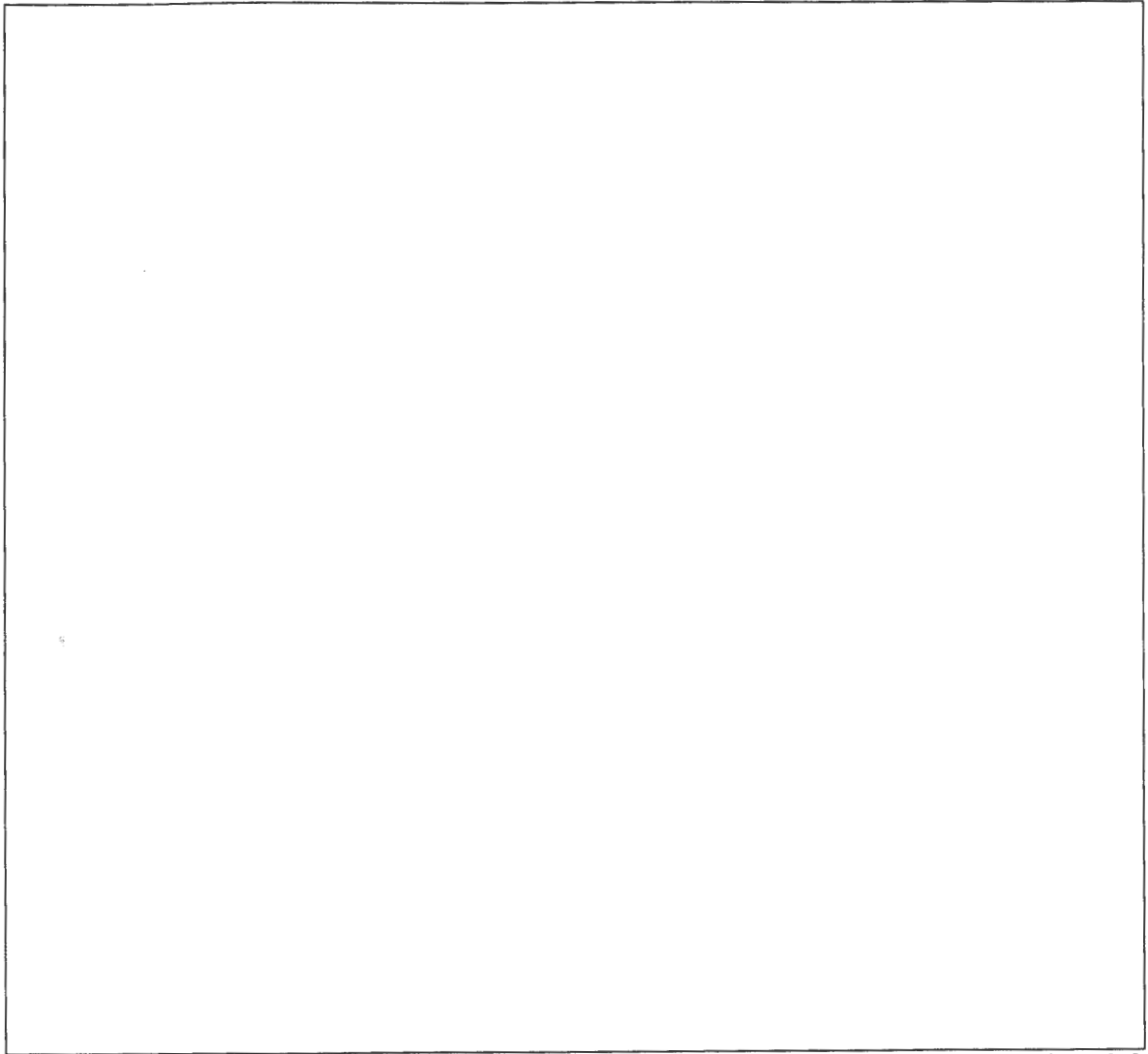
- (i) What does the region 'X' represent?

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[1 mark]



- (ii) Draw a similar diagram to show how the niches of the two species will change over time.



[4 marks]

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- (c) (i) Identify TWO types of interactions, other than competition, between organisms in communities.

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[2 marks]

- (ii) Define ONE of the types of interactions identified in (c) (i) and use an example to explain how it may influence the population numbers of an organism in an ecosystem.

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[4 marks]

- (iii) Outline the role of adaptation in addressing the interaction discussed in (c) (ii).

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[2 marks]

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(iv) Discuss the relationship between species diversity and ecosystem stability.

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[6 marks]

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2. Two groups of students were taken to a natural savannah ecosystem where they determined the distribution of three plant species. Group I used the line transect method while Group II used the quadrat method. The following results were recorded by the students.

Group I

TABLE 1: RECORDS OF PLANT SPECIES IN A SAVANNAH USING THE LINE TRANSECT METHOD

Plant Species	Distance along Line Transect (m)										
	5	10	15	20	25	30	35	40	45	50	
A	✓	✓	✓	✓	✓	✓	x	x	x	x	✓ Present
B	x	x	✓	x	x	x	✓	✓	✓	✓	x Absent
C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Group II

TABLE 2: RECORDS OF PLANT SPECIES IN A SAVANNAH USING THE QUADRAT METHOD

Plant Species	Quadrat Number/Number of Individuals									
	1	2	3	4	5	6	7	8	9	10
A	8	5	0	0	4	2	9	11	6	8
B	4	2	8	10	3	15	1	3	1	0
C	6	7	9	4	4	7	6	5	8	4

- (a) (i) Explain the difference between the methods used by Group I and Group II respectively.

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[3 marks]

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- (ii) A student decided to use the data collected by Group II to estimate the density for Species A and the percentage frequency of Species B. Calculate the values for each of these two parameters using the data collected by Group II.

Density:.....
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Percentage frequency:.....
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[6 marks]

- (iii) The results in Table 2 show a type of interaction between Species A and Species B. Use the data in the table to explain this type of interaction.

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[3 marks]



- (b) (i) Describe how the data in Tables 1 and 2 may be used to provide information on the distribution of the three plant species.

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- (ii) Explain TWO ways in which human activities can disrupt the integrity of natural ecosystems.

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[4 marks]

Total 20 marks

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MODULE 2

Answer BOTH questions.

3. Figure 2 illustrates how the population size of Country X is influenced by demographic characteristics/factors represented by the letters A, B, C and D.



Figure 2. Population of Country X

- (a) Identify the demographic characteristics/factors labelled A, B, C and D.

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[4 marks]

- (b) (i) Outline TWO reasons why urbanization is likely to occur in a Caribbean country.

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[4 marks]



- (iii) Discuss a suitable approach that can be used to minimize any ONE of the environmental impacts discussed in (b) (ii).

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4. Table 3 shows demographic statistics for four Caribbean countries. Use the data provided in the table to answer the questions that follow.

TABLE 3: DEMOGRAPHIC STATISTICS FOR FOUR CARIBBEAN COUNTRIES

Country	Number of Live Births in 2005	Number of Fertile Women (15–49 years) in 2005
A	434	281 100
B	964	455 100
C	1 100	219 540
D	756	187 950

- (a) Define the following terms:

- (i) Total fertility rate

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[2 marks]

- (ii) Replacement level fertility

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[2 marks]

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(b) Calculate the total fertility rate for EACH country in Table 3.

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[4 marks]

(c) Use the values calculated in (b) to determine which country is at its replacement level fertility. State TWO reasons for your response.

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[3 marks]



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- (d) (i) Explain the significance of the total fertility rates calculated for countries A and C.

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[2 marks]

- (ii) Describe TWO environmental impacts that may occur as a result of the fertility rates in Country C.

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[4 marks]

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- (iii) Discuss ONE measure which the Caribbean governments can implement to control the birth rates.

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[3 marks]

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MODULE 3

Answer BOTH questions.

- 5 (a) The table below shows types of natural resources in the Caribbean. Examples of these resources are not given. Complete the table by stating an example of each type of natural resource shown.

TABLE 4: NATURAL RESOURCES

Types of Natural Resources in the Caribbean	An Example of the Natural Resource
Ecosystems	
Water	
Landscape	

[3 marks]

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- (ii) Outline ONE process that may be used to minimize the environmental impacts discussed in (i).

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[3 marks]

- (c) Using a **named** example, explain how the Ramsar Convention may be used as a tool for natural resource conservation in the Caribbean.

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[5 marks]

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6. A small country, A, consists of 450 km² of uninhabited moist tropical forests. This area is home to endemic bird species. It is also the home of 2 amphibians, 2 reptiles and 65 plants which are found only in the area. It is an area with high ecotourism value; however, it is at risk from bauxite mining.

Unfortunately for the birds, the landscape, and many communities, the country is pushing hard to extract every bit of bauxite from the soil, to export for aluminium production. Tourism now generates 45 per cent of the country's foreign earnings and provides jobs for approximately a quarter of the working population. Mining employs fewer persons and is not sustainable.

- (a) Use examples from the description of Country A to distinguish between consumptive and nonconsumptive uses of natural resources.

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[3 marks]

- (ii) Consider the following statement: "If a natural resource is to be exploited for foreign exchange earnings, it does not have to result in a depletion of its ecosystem value".

Evaluate this statement using the example of Country A.

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[6 marks]

Total 20 marks

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

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