



88056411

**ENVIRONMENTAL SYSTEMS  
STANDARD LEVEL  
PAPER 2**

Thursday 10 November 2005 (afternoon)

1 hour 15 minutes

Candidate session number

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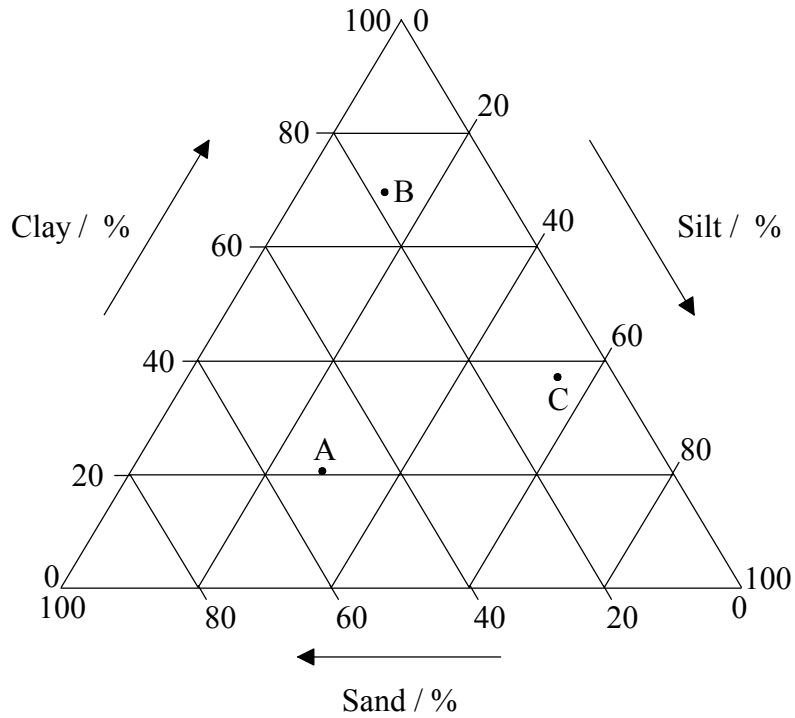
**INSTRUCTIONS TO CANDIDATES**

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all of Section A in the spaces provided.
- Section B: answer one question from Section B. Write your answers on answer sheets. Write your session number on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.
- At the end of the examination, indicate the numbers of the questions answered in the candidate box on your cover sheet and indicate the number of sheets used in the appropriate box on your cover sheet.

**SECTION A**

Answer **all** the questions in the spaces provided.

1. The diagram below shows the percentages of sand, silt and clay in three different soil samples labelled A, B and C. The arrows show the direction in which the percentages should be read.



- (a) Use the diagram to complete the table below for soil samples B and C. Soil sample A has been done for you as an example. [2]

Sample name	Sand / %	Silt / %	Clay / %
A	51	28	21
B		12	
C	8		

(This question continues on the following page)

*(Question 1 continued)*

(b) Another sample of soil is found to contain 33g of sand, 23g of silt and 65g of clay.

(i) The percentage of clay is 54 %. Calculate the percentages of sand and silt in the above sample. [2]

Sand: .....

Silt: .....

(ii) Plot the sample on the diagram opposite, and label it D. [1]

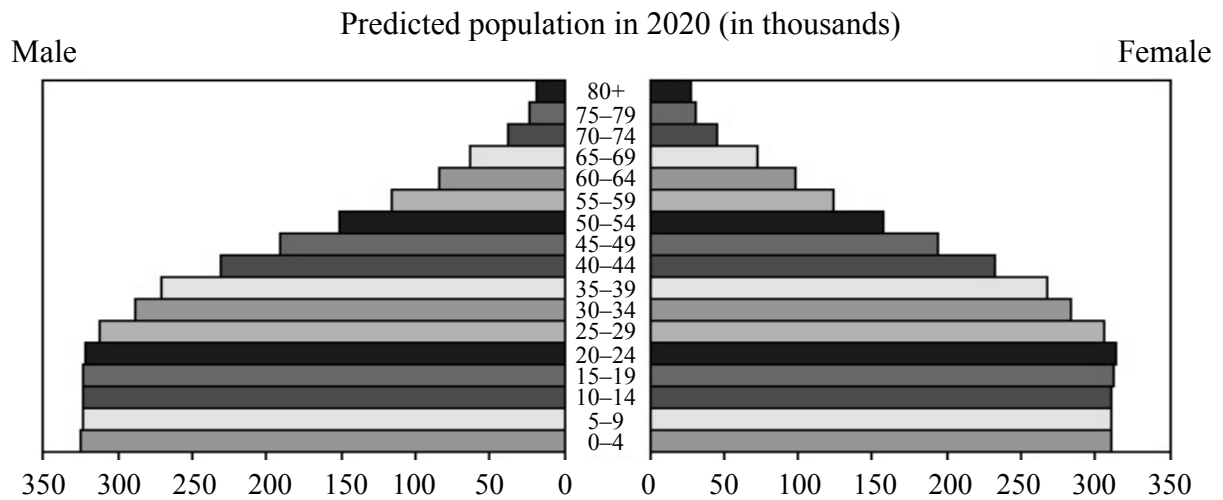
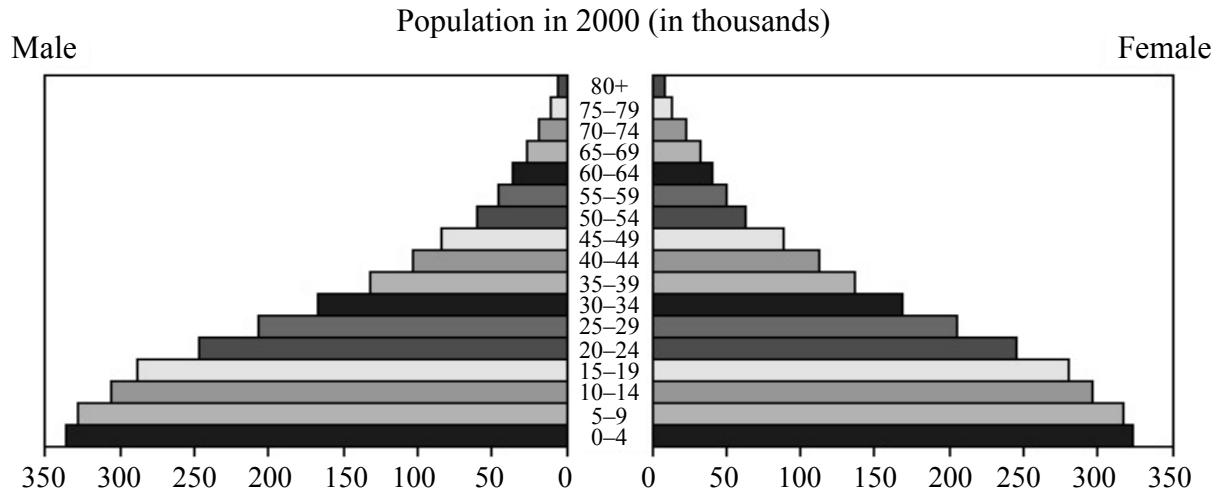
(c) Explain why soil sample B may have puddles of water standing on it after heavy rain. [2]

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(d) Outline **two** properties of soil sample A that may change as a result of the addition of organic matter. [2]

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2. The diagrams below are population pyramids for a South American country in the year 2000 and the predicted population of the same country in 2020.



[Source: US Census Bureau, International Database]

(a) (i) State how the **total** population size is expected to change between 2000 and 2020. [1]

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(ii) Calculate the number of females aged 0–19 years in the year 2000. [1]

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*(Question 2 continued)*

- (iii) Explain why the number of females aged 0–19 in the 2000 pyramid is important in predicting the population in 2020. [2]

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- (iv) State **two** ways in which the data on the predicted size and age distribution of the population in 2020 could be used to help the country plan for the future needs of its citizens. [2]

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- (b) State **three** national policies that the government of a country might use to reduce the rate of population growth. [3]

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- (c) Explain which features of the 2020 pyramid indicate that the rate of population growth is expected to have decreased by this date. [2]

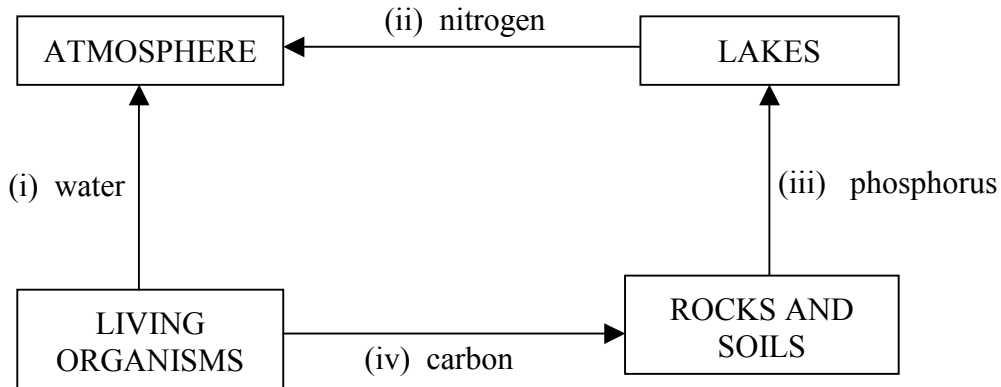
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3. The diagram below represents some flows of different materials between storages.



(a) Outline a transfer or transformation process by which the material named on each arrow could move between the storages shown, in the direction indicated by the arrows.

- (i) water: ..... [1]  
.....
- (ii) nitrogen: ..... [1]  
.....
- (iii) phosphorus: ..... [1]  
.....
- (iv) carbon: ..... [1]  
.....

(b) Describe how significant amounts of phosphorus could be transferred from the water in a lake to a bird which feeds on fish caught from the lake. [2]

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.....

(c) Predict, giving a reason, what may happen to the populations of fish in a lake if the water becomes more acidic. [2]

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.....  
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*(This question continues on the following page)*

*(Question 3 continued)*

- (d) Explain how material from **one** of the storages shown in the diagram might be used to reduce the acidity of a lake. [1]

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.....

- (e) State and explain whether a lake is an example of an open, closed or isolated system. [1]

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.....

**SECTION B**

Answer **one** question. Write your answers on the answer sheets provided. Write your school code and candidate code on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.

Each essay question is marked out of a total of **[20]** of which **[3]** are allocated to the expression and development of ideas as follows:

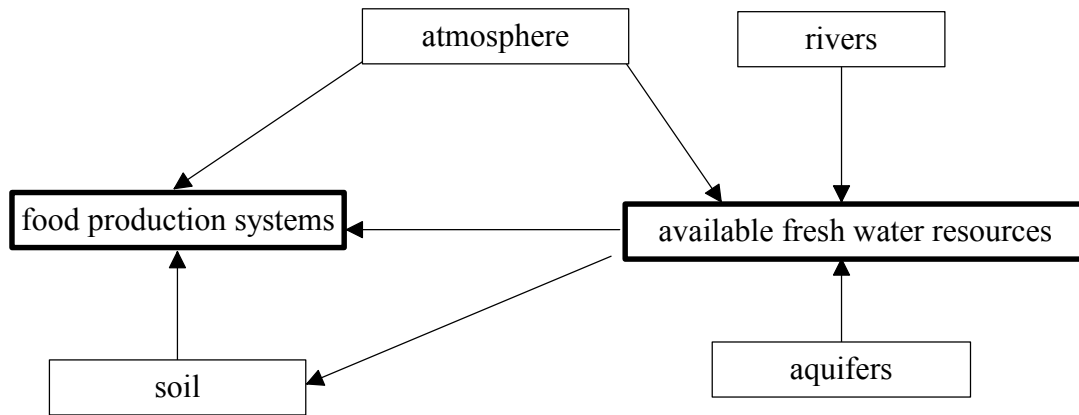
- [0]** No expression of relevant ideas.
- [1]** Expression and development of relevant ideas is limited.
- [2]** Ideas are relevant, satisfactorily expressed and reasonably well developed.
- [3]** Ideas are relevant, very well expressed and well developed.

4. (a) Describe the range of processes by which methane, ozone and sulfur dioxide are formed or released as a result of human activities. [7]
- (b) Describe and explain the effects of the three atmospheric pollutants listed in (a) on:
- (i) global climate [4]
  - (ii) primary productivity. [3]
- (c) Evaluate ways in which the amount of sulfur dioxide released into the atmosphere by human activities could be reduced. [3]
- Expression of ideas* [3]

5. (a) Compare the roles of herbivores, parasites and predators in a named ecosystem. Use examples to illustrate your answer. [8]
- (b) Describe and explain, with the aid of a sketch graph, how the populations of a named predator and its prey change over time. [6]
- (c) Discuss how negative feedback processes control populations of a named parasite. [3]
- Expression of ideas* [3]



6. The diagram below shows **some** of the material flows which affect food production and fresh water resources.



- (a) Distinguish between the terms *sustainability* and *sustainable yield*. [2]
- (b) Describe and explain how food production systems and fresh water resources can be managed sustainably. [10]
- (c) Using examples, suggest ways in which non-renewable resources, **excluding** fossil fuels, could be managed to reduce the rate at which they are being depleted. [5]

*Expression of ideas* [3]