

Surname					Other Names				
Centre Number					Candidate Number				
Candidate Signature									

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General Certificate of Education
 January 2004
 Advanced Subsidiary Examination



ENVIRONMENTAL SCIENCE
Unit 2 The Lithosphere

ESC2

Friday 9 January 2004 Afternoon Session

No additional materials are required.
 You may use a calculator.

Time allowed: 1 hour

Instructions

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided. All working must be shown.
- Do all rough work in this book. Cross through any work you do not want marked.

Information

- The maximum mark for this paper is 60.
- Mark allocations are shown in brackets.
- You will be assessed on your ability to use an appropriate form and style of writing, to organise relevant information clearly and coherently, and to use specialist vocabulary, where appropriate.
- The degree of legibility of your handwriting and the level of accuracy of your spelling, punctuation and grammar will also be taken into account.

For Examiner's Use			
Question	Mark	Question	Mark
1			
2			
3			
4			
5			
6			
7			
8			
Total (Column 1)			
Total (Column 2)			
TOTAL			
Examiner's Initials			

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

- 1 (a) The statements in the table refer to the process of weathering. Complete the table by putting a ✓ in the appropriate column.

Statement	True	False
Jointing increases the rate of weathering		
Igneous rocks cannot be weathered		
Different minerals in the same rock may weather at different rates		
Weathering is a purely chemical process		

(4 marks)

- (b) What are the products of weathering?

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(2 marks)

6

2 Complete the table to show the major uses of the rocks/minerals.

Rock/Mineral	Major use
Granite	
	Cement, glass
	Paper, pottery, pharmaceutical, filler

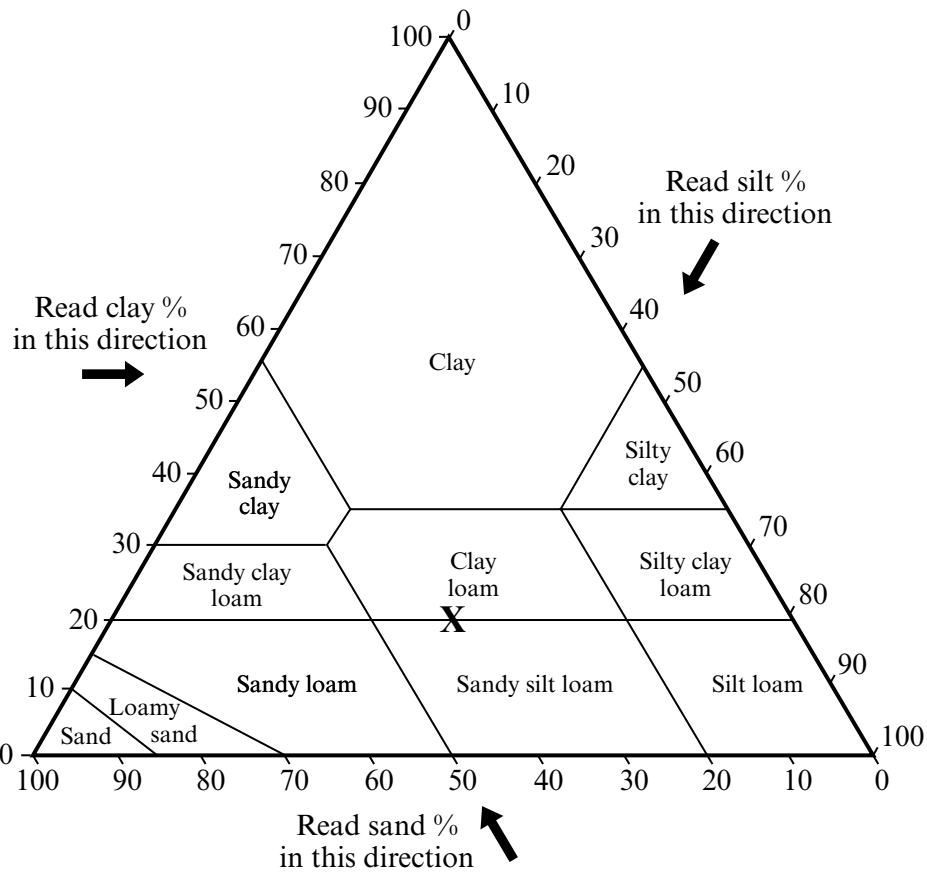
(3 marks)

3

TURN OVER FOR THE NEXT QUESTION

Turn over ►

3 The triangular graph shows the percentage composition of soils.



Source: adapted from F. M. COURTNEY and S. T. TRUDGILL, *The Soil: An introduction to Soil Study* 2nd Edition (E. Arnold) 1976

(a) Use the triangular graph to:

- (i) name the soil with composition 8% sand, 70% silt, 22% clay;

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(1 mark)

- (ii) state the percentage composition of soil X.

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(1 mark)

(b) Outline a method which could be used to determine the organic matter content of a soil.

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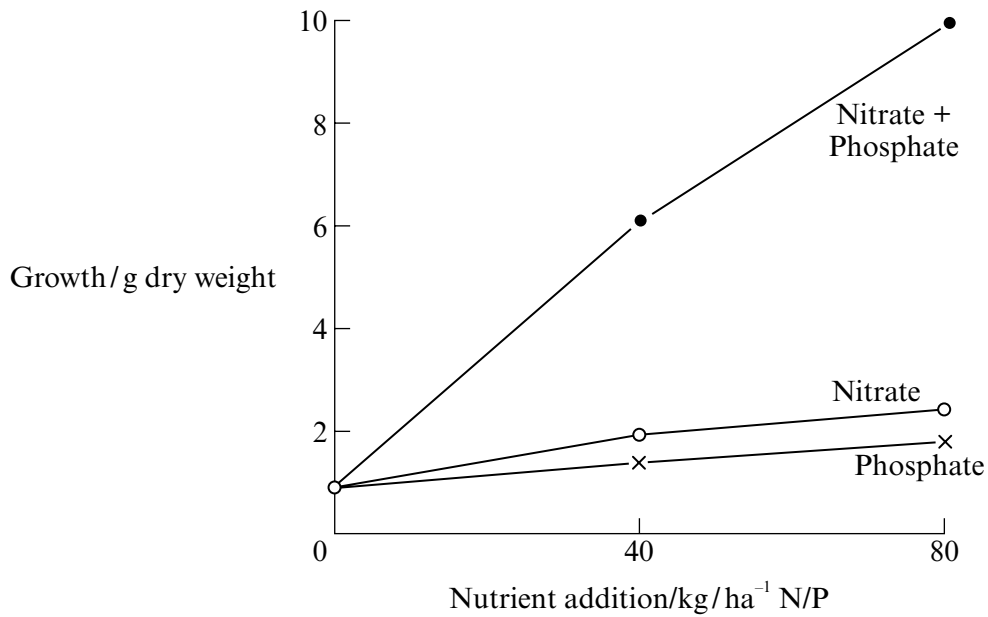
(4 marks)

$\frac{\quad}{6}$

TURN OVER FOR THE NEXT QUESTION

Turn over ►

4 Ryegrass is often planted to aid the reclamation of old mine workings. The graph shows the effect of adding nitrate and phosphate on the growth of ryegrass on mine waste.



Source: adapted from R. P. GEMMELL, *Colonization of Industrial Wasteland* (Edward Arnold) 1977

(a) Summarise the data shown.

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(2 marks)

(b) Outline the techniques used in the reclamation of an area of derelict land that you have studied.

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(6 marks)

5 Explain the terms:

(a) leach;

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(2 marks)

(b) low grade ores.

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(2 marks)

4

TURN OVER FOR THE NEXT QUESTION

Turn over ►

6 Carbon, nitrogen and phosphorus are cycled between gaseous, hydrological, sedimentary and biological reservoirs.

(a) (i) Suggest why phosphorus is often a limiting factor even though organic and inorganic phosphorous compounds may become concentrated near the soil surface.

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(1 mark)

(ii) In what form do plants absorb phosphorus?

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(1 mark)

(b) Outline the significance for plants of the following processes.

(i) Nitrogen fixation

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(4 marks)

(ii) Denitrification

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(4 marks)

7 (a) Many proposed land use changes have been the subject of public inquiries.

Outline a potential conflict in proposals to:

(i) relax the green belt designation;

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(2 marks)

(ii) route a public footpath across agricultural land.

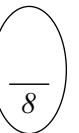
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(2 marks)

(b) State **four** ways in which Country Parks differ from National Parks.

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(4 marks)



TURN OVER FOR THE NEXT QUESTION

Turn over ►

8 The table shows rates of soil erosion in Africa.

Location	Soil erosion/tonnes/km ² /year		
	Forest	Cultivated land	Bare soil
Upper Volta	0.1	4.5	7.6
Senegal	0.2	7.3	15.0
Kenya	0.1	13.6	23.0
Tanzania	0.3	37.0	118.0

(a) Summarise the data shown.

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(3 marks)

(b) Explain how the mismanagement of soils can lead to accelerated erosion.

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