

**MARK SCHEME for the May/June 2012 question paper  
for the guidance of teachers**

**8291 ENVIRONMENTAL MANAGEMENT**

**8291/12**

Paper 1, maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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## General notes

Symbols used in Environmental Management mark schemes.

- / separates alternatives for a marking point – other valid ways of expressing the same idea are also credited
- ; separates points for the award of a mark
- [3]** indicates the number of marks available
- [max 3]** the number shows the maximum number of marks available for the question where there are more marking points than total marks available
- [max 3] when part of the marks of a question must come from part of the mark scheme, this is indicated by non-bold marks showing the internal maxima for different parts of the question  
these non-bold marks are also used to show marks for bands where banded mark schemes are used
- italic* indicates that this is information about the marking points and is not required to gain credit  
italic text is also used for comments about alternatives that should be accepted, ignored or rejected
- ora or reverse argument – shows that an argument from an alternative viewpoint will be credited
- AW alternative wording, sometimes called 'or words to that effect' –  
AW is used when there are many different ways of expressing the same idea
- ( ) the word / phrase in brackets is not required to gain marks but sets the context of the response for credit  
e.g. (nuclear) waste – nuclear is not needed but if it was described as a domestic waste then no mark is awarded
- volcanic underlined words – the answer must contain exactly this word
- ecf error carried forward – if an incorrect answer is given to part of a question, and this answer is subsequently used by a candidate in later parts of the question, this indicates that the candidate's incorrect answer will be used as a starting point for marking the later parts of the question

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### Section A

Answer **all** questions in this section.

- 1 (a) (i) sound emitted into the atmosphere at such a level that it causes human discomfort or illness [2]
- (ii) 23 (+/-1) [1]
- (iii) noise from road traffic is more dispersed (1) as roads extend to all parts of urban areas (1) and affects more people. Aircraft noise is at its greatest near airports (1) and the remaining noise is at high altitude (1) [2]
- (iv) road noise; is of lower dB and although more widely spread affect fewer people severely; the most severe traffic noise is around city centres, at main road junctions and near industry (1)
- air traffic; highest near airports along landing and take-off flight paths  
although fewer are generally affected the higher level of noise affects a proportionately greater number of people (1) [2]
- (v) credit 2 marks for a general comment and 4 for valid statements about the sources
- although affecting fewer people these are easily recognisable contributors to noise pollution (1)  
the percentages are lower with those strongly affected being very low (1)  
comment on each separate source, comparing e.g. affected vs. strongly affected (4) [6]
- (b) credit 3 items each with 2 marks divided into 1 mark for description and 1 mark for explanation  
there is 1 general mark for recognising the likelihood of noise variations due to differences in land use
- high noise levels = main road with traffic, city centre, building noise, industry, and the construction site  
low noise and noise reduction = open areas (green), woodland, and modern probably double glazed buildings [7]

[Total: 20]

- 2 (a) (i) MEDCs 49  
LEDCs 257 [2]
- (ii) MEDCs: a slower rate of growth from 50 to 67 (as urbanisation has already taken place) (1) in contrast to the > 10 million which is 42 to 91 (1)
- LEDCs again have a higher growth rate (1) of 68 to 206 (1) which is slower than their > 10 million group which is 11 to 268 (1) [4]

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- (iii) LEDCs are experiencing rapid urbanisation (1) due to push and pull factors / named factors (1) but this has already happened in MEDCs (1) followed by counter urbanisation (1). Some > 10 million are a product of government policy. Credit other valid reasons [3]
- (iv) this happens as 5 to 10 million cities expand and become > 10 million cities [1]
- (b) (i) shanty towns on the outskirts (1) as it is the place of arrival for migrants and land is cheap (1); in a ring outside the higher quality housing (1)  
poor residents occupy the area of low cost housing outside the central area (1); poor quality housing is often close to industrial areas (1) [3]
- (ii) industrial development follows the main roads (1) and moves towards the airport (1); therefore non-urban (possibly agricultural land) land is lost (1). An expanding city needs food (1) therefore needing agricultural land (intensive farming) (1) [3]
- (c) there are 4 marks; credit 2 issues each with 2 marks  
the main environmental issues are: overcrowding leading to squalor, poor sanitation, disease, crime, slope instability [4]

**[Total: 20]**

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### Section B

Answer **one** question from this section.

- 3 (a)** a mature soil or climax involves the four upper factors working together over time  
some consideration of the contribution made by each of climate, biology, geology and relief.  
some candidates will couch these in terms of biotic and abiotic factors

8 to 10 mark answers will consider each factor in the context of time

4 to 10 mark answers should give consideration to at least 2 factors and be vague about the role of time

1 to 3 mark answers will either be very brief or only deal with one factor

**[10]**

- (b)** this question requires:

a description of three ways in which human activity causes soil deterioration

a selection of appropriate examples

an assessment of how soil fertility can be maintained

suggested annotations: agr = agricultural activity; d = deterioration s = sustainable method;  
ass = assessment

ways can include, overgrazing, overcropping, inappropriate mechanised farming, down slope ploughing, extensive deforestation

sustainability is really a solution to the issues stated above; but do not credit reflexive of mirror points

how the maintenance and improvement of soils is required

actual examples are needed

according to the examples chosen there will be varying degrees of success or failure

Band 1 answers will satisfy the three requirements of the question. In particular there should be a good selection of examples and assessment (25–30)

Band 3 answers will develop at least two ways well. The examples may be weakly developed and assessments will be confined to very brief statements (13–18)

Band 4 answers may be very brief but relevant. Three ways may be covered but the answer will be weak on sustainability and assessment (6–12)

**[Total: 40]**

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- 4 (a) answers should refer to Fig. 4.1. 6 for description and 4 for explanation.  
 fig. 4.1 refers to three important risks and impacts caused by global warming.  
 I = unique and threatened systems between 2000 and 2025 has some risk but by 2040 as temperature rises it is expected to affect many; this is a product of increased drought, loss of habitats and consequent population pressures  
 II = this is very similar to I; climatic change is a consequence of global warming; the model suggests an acceleration of climatic change as greenhouse gases increase (carbon dioxide and methane)  
 III = effects will be varied; regions respond differently; some may cool or receive more rainfall, the opposite for others. It is expected that weather events may intensify

8 to 10 mark answers will effectively cover both the description and explanation of the three scenarios

4 to 7 mark answers will develop at least two of the bars but the explanation will be weak

1 to 3 mark answers will have relevance but be weak in each compartment **[10]**

- (b) the question requires:  
 global warming and climatic change (integrated into the policies)  
 national policies  
 international policies

suggested annotations: g = global warming; c = climatic change; ai =addressed at international scale: an = addressed at national scale

global warming and climatic change: an increasing issue exemplified by increases in temperature, intensification of weather events, glacier/ice sheet melt

ref. to alternative views

national policies include: reducing greenhouse gas emissions (CO<sub>2</sub>, NO<sub>x</sub>, CFCs, ozone); therefore greener fuels, emission controls, afforestation, education, national concern (propaganda to some)

international policies derive from meetings, protocols i.e.a unifying of national policies

Band 1 answers will cover each requirement. At this level answers should recognise that national and international policies are interwoven. Essays will contain good detail and be well balanced. There should be a high level of evaluation (25–30)

Band 3 answers may express knowledge of global warming and make relevant and generalised statements about national and international policies. Evaluation will be confined to brief statements about success or failure (13–18)

Band 4 answers may be brief but relevant or give brief reference to either national or international policies. Understanding of global warming and climatic change will be poorly expressed (6–12)

**[Total: 40]**

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- 5 (a) left photograph shows forest dieback  
 conifers are evergreen, retaining needles all year and are more effective at filtering pollution;  
 acid particulates accumulate along leaf margins damaging their waterproofing function  
 sulfur dioxide reduces tree growth by slowing the movement of sugars  
 higher acidity removes moss from trees and exposes the bark

right photograph show the effects of acid erosion on gravestones, granites are affected by hydrolysis which breaks down silicates; limestones by carbonation, more soluble minerals by solution i.e. gravestones and buildings are affected by accelerated chemical weathering

8 to 10 mark answers should balance the effects of acid rain on trees and stone and for each identify the effect and provide at least one explanation for each

4 to 7 mark answers will identify the effects but will give the chemical processes superficial or weak coverage

1 to 3 mark answers will lack clarity of chemical processes and give vague descriptions of the photographs

**[10]**

- (b) the question requires:  
 examples of urban areas  
 a description of the main contributors to atmospheric pollution  
 an assessment of the reduction methods

suggested annotations: e.g.; c = contributor; m= measure

although the exact nature of the pollution will depend on the examples chosen, there are contributors that are common to most cities; the relative scales are different  
 most common are:

traffic (CO, NO<sub>x</sub>, lead, CO<sub>2</sub>), industry (SO<sub>2</sub>, photochemical oxidants, heat)

domestic (waste, gases), noise (varied sources)

reduction might include: emission controls on cars, chimney scrubbers, alternative energy, legislation via clean air acts etc, reducing energy consumption and international agreements

evaluations will vary according to the examples chosen

MEDCs may have a high rate of success whilst many LEDCs struggle

due to economic, social and governmental pressures large developing countries may receive negative assessments

Band 1 answers will cover the three requirements and contain high quality evaluations. The examples will be well chosen and candidates will express a clear and detailed understanding of both causes and reduction methods (25–30)

Band 3 answers will use examples but lack detail on the causes and reduction methods. There will be some evaluation which is limited to brief statements (13–18)

Band 4 answers although relevant may be brief and lack detail on contributors and reduction methods (6–12)

**[Total: 40]**

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### Generic Mark Scheme

<b>Band</b>	<b>Level Descriptors</b>	<b>Marks</b>
Band 1	The candidate demonstrates the following abilities where appropriate to:	25–30
A	<ul style="list-style-type: none"> <li>select and use a very good range of accurate and appropriate knowledge;</li> <li>integrate knowledge from a wide range of areas;</li> <li>show a good understanding of the concepts involved;</li> <li>make good use of knowledge derived from personal experience and study;</li> </ul>	
B	<ul style="list-style-type: none"> <li>select and use a form and style of writing appropriate to purpose and complex subject matter with facility;</li> <li>communicate complex ideas clearly and accurately, in a concise, logical and relevant way;</li> </ul>	
C	<ul style="list-style-type: none"> <li>analyse issues and problems well and evaluate them appropriately;</li> <li>develop complex reasoned arguments and draw sound conclusions on the evidence;</li> </ul>	
Band 2	The candidate demonstrates the following abilities where appropriate to:	19–24
A	<ul style="list-style-type: none"> <li>select and use a good range of accurate and appropriate knowledge;</li> <li>integrate knowledge from a wide range of areas;</li> <li>show an understanding of the concepts involved;</li> <li>demonstrate a range of awareness of personally derived and studied knowledge;</li> </ul>	
B	<ul style="list-style-type: none"> <li>select and use a form and style of writing appropriate to purpose and complex subject matter;</li> <li>communicate complex ideas clearly and accurately, in a concise, logical and relevant way;</li> </ul>	
C	<ul style="list-style-type: none"> <li>analyse issues and problems and evaluate them competently;</li> <li>develop complex reasoned arguments and draw conclusions on the evidence;</li> </ul>	



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Band 3	The candidate demonstrates the following abilities where appropriate to:	13–18
A	<ul style="list-style-type: none"> <li>• Select and use some accurate and relevant knowledge. integrate knowledge from a limited range of areas;</li> <li>• show an adequate understanding of the concepts involved;</li> <li>• demonstrate a limited range of awareness of personally derived and studied knowledge;</li> </ul>	
B	<ul style="list-style-type: none"> <li>• select and use a form and style of writing appropriate to purpose and subject matter;</li> <li>• communicate the ideas clearly and in a logical way</li> </ul>	
C	<ul style="list-style-type: none"> <li>• undertake some analysis of issues and problems and make a superficial evaluation;</li> <li>• develop arguments and draw conclusions;</li> </ul>	
Band 4	The candidate demonstrates the following abilities where appropriate to:	6–12
A	<ul style="list-style-type: none"> <li>• select a limited range of accurate and relevant knowledge.</li> <li>• integrate knowledge from a very limited range of areas;</li> <li>• show a modest understanding of the concepts involved;</li> </ul>	
B	<ul style="list-style-type: none"> <li>• select and use a limited style of writing, appropriate to purpose and subject matter;</li> <li>• communicate ideas with limited clarity;</li> </ul>	
C	<ul style="list-style-type: none"> <li>• demonstrate limited analysis of issues and problems with limited evaluation;</li> <li>• develop limited arguments and draw limited conclusions;</li> </ul>	
Band 5	The candidate demonstrates the following abilities where appropriate to:	1–5
A	<ul style="list-style-type: none"> <li>• select and use some relevant knowledge;</li> <li>• integrate knowledge from a very limited area;</li> <li>• show a restricted understanding of the concepts involved;</li> </ul>	
B	<p>When producing written communication:</p> <ul style="list-style-type: none"> <li>• select and use a very limited style of writing appropriate to purpose and subject matter</li> <li>• communicate with limited clarity;</li> </ul>	
C	<ul style="list-style-type: none"> <li>• undertake a very limited analysis of issues, problems and evaluation;</li> <li>• recognise some arguments and conclusions</li> </ul>	

**[Total: 40]**